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March 1987

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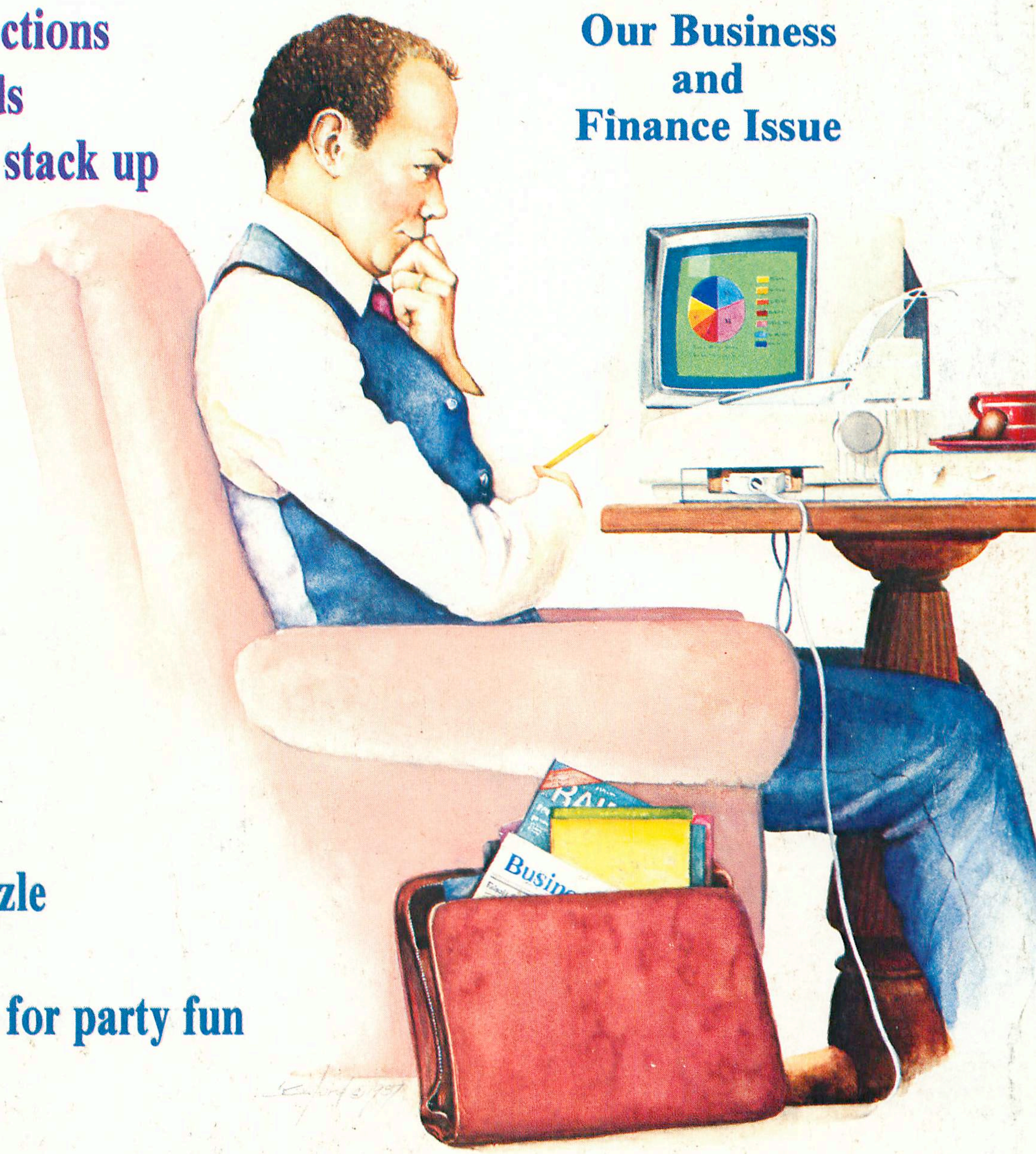

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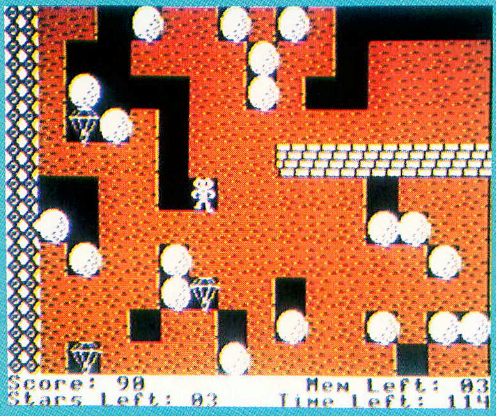

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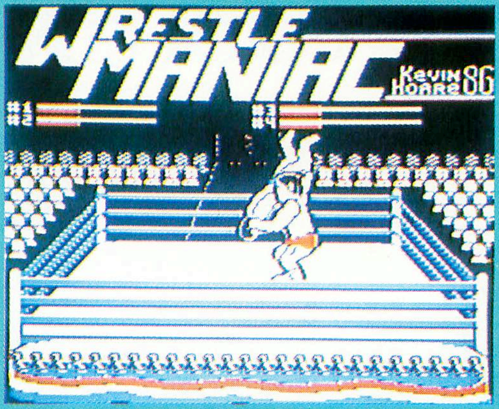

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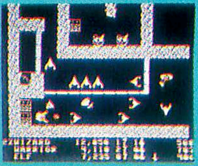

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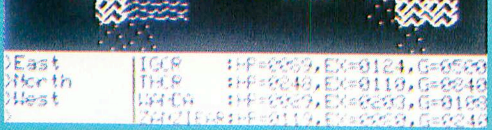

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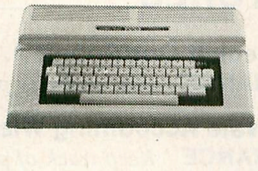

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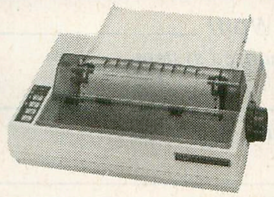

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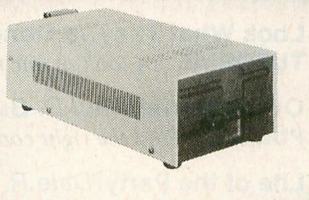

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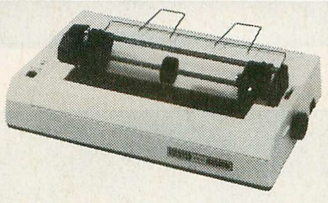

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Under The RAINBOW

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NEXT MONTH: Always entertaining and efficient, the CoCo is also a household companion. Our April Home Help issue is packed with programs and tips to let your CoCo shoulder its share of tedious household chores and to let you have more time for important things. We've got the CoCo 3 crowd covered, too, with programs and tutorials just for the new addition to the family.

Be it ever so humble, there's no place like home for your CoCo and its RAINBOW companion. Look to THE RAINBOW for the best articles, programs and product reviews for the Color Computers 1, 2 and 3!

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The RAINBOW

March 1987 Vol. VI No. 8

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LETTERS TO THE RAINBOW

Computers To Go

Editor:

Two of your RAINBOWfest articles have mentioned an accomplishment by CoCo users who have made their CoCos portable. I have a Model 4P and, while I like the clarity of the monitor and the built-in number pad, I wish it had the insides of my CoCo. I lack the skill and the tools to make the necessary changes. Is there another reader in the Pittsburgh area who has the ability and the desire to help me with the transplant?

I enjoy your magazine very much. Few products provide a support service as good as yours. It is like having a user's club meeting in my home every month.

John H. Mooney
217 Terrace Avenue
Zelienople, PA 16063

IBM Follows the Leader

Editor:

Chalk up another point for the new CoCo 3 and CM-8 monitor. In a recent issue of *PC Weekly*, (December 9, 1986) it was announced that a new IBM PC will be introduced in 1987 that "will support an analog (as opposed to the standard digital) monitor." Is IBM trying to be Tandy Color Computer 3 compatible?

Steve Ostrom
Minnetonka, MN

A Powerful Solution

Editor:

I do not understand why some people need a separate power indicator. Years ago, my system got to a point where I had to ask myself, "Now, what piece of equipment is on?" In addition, the floor was covered with extension cords. Then I woke up.

Since the power requirement of the normal home computer system is very low, much less than the normal 15 watts of a household outlet, I decided to use a power strip to turn everything on or off at the same time. If I need more than the six or eight outlets on a power strip, I just use a second one either from the first or from a second wall outlet. I have never had any problems.

Bobi Tweddell
Brampton, Ontario

Super Controller Update

Editor:

Owners of the Disto Super Controller may experience problems using it with the new CoCo 3. A timing problem in some of the older controllers can cause the computer to "hang up" while accessing a disk. If you have this problem, contact C.R.C. Computers, Inc. at (514) 383-5293. The CoCo 3 update costs $8 and includes return shipping and handling.

Tony DiStefano
C.R.C. Computers
Montreal, Quebec

BACK TALK

Editor:

In the November 1986 issue [Page 10], E.W. Rees stated that the *VIP Library* is very hard to use and that Softlaw [now VIP Technologies] has terrible support. I must agree with him on the support, but disagree about the ease of use. I find *VIP* programs very easy to use. To me, the documentation is very complete and easy to understand. On top of all that, every program has a help feature. I truly enjoy using *VIP* software, and find them very user-friendly.

Paul E. Jones
Princeton, KY

Still Kickin' in Spokane

Editor:

The membership of the MC-10 International User's Group read with great resentment Mr. Scerbo's comments ["Prepare for Thanksgiving Cooking With Liquid Measure," November 1986, Page 62] about the MC-10 computer. If his intent was to see how much flack he could get, or to poll readers to see how much interest is left in the MC-10, he has succeeded.

Tandy stopped producing the MC-10 micro Color Computer, but it did not die. It is a great, affordable piece of hardware. This computer allowed some of us less fortunate to get our feet in the door of the computer world, and most of us have never set foot outside since.

Our group was started in 1984 with the publishing of newsletters to inform computer users about the wonders of the MC-10. We grew rapidly, combining forces from six countries, and in 1986, each issue of our newsletter contained 20 pages of information about the MC-10 (with a couple pages dedicated to crosslinking information with CoCos).

Larry Haines
East 2924 Liberty
Spokane, WA 99207

Fred Scerbo replies to Mr. Haines and other MC-10ers in his "Wishing Well" column this month.

HINTS AND TIPS

Editor:

TX word processor is CoCo 3 compatible. Edit Line 6 and change the variable `G=65495` to `G=65497`. Save *TX* on a new disk and label it "CoCo 3 Only" (the new value in `G` scrambles the screen on the older CoCos). *TX* must be used with the `WIDTH 32` screen display.

An attempt to list Line 0 of *TX* will lock up the CoCo 3.

Fred Kolesar
Westfield, PA

Cassette Port Conversion

Editor:

Readers interested in building an adapter that will convert the cassette port of a CoCo to an RS-232 port will find construction plans in the December 1986 issue of *Modern Electronics*. The article includes a BASIC program listing that loads a machine language subroutine to drive a printer from a BASIC program, as well as patches to create an OS-9 printer driver. The following corrections should be made. In Figure 1, the polarity of D2 should be reversed. In Figure 3, the "K" at the top end of R5 should be at the top end of D1 and the top end of C3 should be labeled "t".

Duane M. Perkins
Mount Gretna, PA

Aiding the Doctor

Editor:

I'm pleased to see the "Doctor ASCII" column added to RAINBOW. I find this column very informative and interesting. However, in the November 1986 issue [Page 154], Scott Lane asked how the `INKEY$` is used. While the answer Mr. Esposito gave is correct, there is another way to use `INKEY$`. The code I use is as follows:

```
100 EXEC 44539 : A$=INKEY$
```

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The screen dump program in the same issue [Page 156] would not work on my DMP-105 printer. Here are the changes to make it work.

```
1000 FOR I=1024 TO 1535 STEP 32
1010 A$=""
1020 FOR J=I TO I+31
1030 A=PEEK(J)
1040 IF A>95 THEN A=A-64
1050 A$=A$+CHR$(A)
1060 NEXT J
1070 PRINT #-2,A$
1080 NEXT I
1090 RETURN
```

Jack Jordan
Courtland, MS

Thumbs Up for *Solitaire*

Editor:

I've played the commercially available version of *Solitaire* and after a while it gets boring and predictable. I didn't find this to be true with Tudor Jones' version that appeared in the December 1986 issue [Page 76]. It's much easier and doesn't always come up with the same starting set of cards as does the other version. This version also doesn't allow you to cheat.

As a programmer, I found it irresistible to modify Mr. Jones' program slightly. It runs exactly the same. The only two changes I've made were to include Line 141 so that the hearts and diamonds were painted red:

```
141 IF SUIT=1 OR SUIT=3 THEN POKE
  178,2:PAINT(XC+11,YC+22),,0:PO
  KE178,0
```

I also changed the values of `S$(1)` through `S$(4)` so that the cards would have the symbols instead of the letters on top denoting the suits, like this:

```
1230 S$(1)="BR2H3UERFERFDG3":S$
  (2)="R3HUEFU3GHEL3F3HD3EFD2U
  4RDL":S$(3)="BU3F2E2H2G2":S
  $(4)="BRR2LU2L2R4UL4E2FL"
```

With these minor changes, you don't have to look at the H, C, S and D on the card and try to remember which is black and which is red when placing cards.

Bill Bernico
Sheboygan, WI

There is a minor correction to Solitaire *appearing on Page 182 of this issue.*

Clearly a Problem

Editor:

I'd like to point out a bug in the new Enhanced BASIC for the CoCo 3. If you type `CLEAR 17000 : WITH 40`, the computer locks up. If you use a slightly lower value in the `CLEAR` statement, it works. Anything higher than about 16350 does not work.

Raju Dash
Downers Grove, IL

Please read the following letter.

Editor:

I would like to inform all CoCo 3 owners about two potentially dangerous problems concerning programming the CoCo 3. It seems that if you should use the `CLEAR` command to reset the value of the stack pointer in BASIC between the `$2000` to `$3FFF` range when using the Hi-Res text screens, BASIC will destroy its stack clearing the screen. This will crash the computer.

The second problem is using the Hi-Res text screens and the old ROM/RAM page switch at `$FFDE` and `$FFDF`. Should you run a program that uses the 96K switching method, BASIC tries to switch in a page already in use by the Hi-Res text screen with the possibility of losing your work or locking up your machine.

Aside from these glitches in the CoCo 3, I find it better than most 68000-based microcomputers costing much more.

If anyone can explain how Xmodem protocol works, please write me. I am writing a terminal program and will gladly share credit for it.

Mike Pepe
15 Lambs Lane
Manalapan, NJ 07726

REQUEST HOTLINE

Editor:

I am looking for programs in science and math. Does anyone have information on where I can find such programs?

Anthony J. Dee
135 East 38th Street
Erie, PA 16501

Personnel Planner

Editor:

I work at a hospital that requires continuous coverage day and night. I must make out work schedules for three shifts per day, seven days a week, taking into account holiday time, vacation time, etc. This is done by hand and is incredibly time-consuming. If anyone has a program that would help or information about one, please write me.

William Caldwell
1718 Great Highway
San Francisco, CA 94122

Out in Left Field

Editor:

I'm a big baseball card collector and I am trying to make a listing of all my cards using files. Can anyone give me a hand?

Mike Bushman
25655 Salem
Roseville, MI 48066

> *We suggest you see* Baseball Card File *by James W. Wood. His program was in the May 1986 issue on Page 66.*

MC-10 Transfer

Editor:

Is there a program available to convert MC-10 programs to run on the Color Computer 2 with disk? Anyone having this information, write me.

Nila D. Grose
R.D. 1, Box 173A
Manheim, PA 17545

Hand-to-Hand Combat

Editor:

Does anyone know where there is a good hand-to-hand combat game in which you fight different things or people on a certain level and then progress to a different level to fight more? I am looking for one similar to the one in the arcades called "Gladiator."

Mike Rebbecchi
208 Osage Avenue
Somerdale, NJ 08083

INFORMATION PLEASE

Editor:

I have the new CoCo 3 and a DMP-430 printer and I am wondering if there is anyone who has used this printer with a CoCo. I am a member of a local duplicate bridge group and I print bulletins for the club. The printer contains IBM character sets containing the card symbols and I would like to be able to call them up to use. I had a short program that would allow me to do this but, unfortunately, it was accidentally erased and I have not been able to duplicate it. I would appreciate any assistance. Call (803) 873-8375 or write me.

Karl Gulliford
136-B Braly Drive
Summerville, SC 29483

Where Is It?

Editor:

I own a CoCo 1 with 64K ECB, disk drive, printer, modem and cassette deck. I went to a Radio Shack Computer Center hoping that they might solve my long quest for *Flight Simulator II*. They said it would be out in late September or early October. I was wondering if anyone has heard when *Flight Simulator II* will be out since it's already out for many other computers?

Corrie Bender
11216 S.E. 235th Place
Kent, WA 98031

Thinks It Re-Inks

Editor:

I've heard that there is a new printer ribbon on the market. It seems that someone has taken a regular ribbon cartridge and modified it so that it continuously re-inks itself. The cartridge apparently lasts longer than regular cartridges. Is this for real? I have found that costs are substantial for ribbon replacement. Do you know who I can contact to buy this new type of ribbon?

Sharon A. Hartzog
2546 Moonstone Drive
San Diego, CA 92123

> *We are not aware of a regular ribbon cartridge that re-inks itself continuously. However, Computer Friends advertises an automatic ribbon re-inker on Page 89 in the January 1987 issue. They may be able to provide you with more information.*

Unsavory Characters

Editor:

In "Reviewing Reviews," November 1986 [Page 131], Graham Langford of Pickering, Ontario complained of a problem with his *Penpal* software that I experience when using *Ultra Telepatch* with *Telewriter 64*. The problem completely spoils an otherwise excellent word processor. The keys A, H, I, G and O, when held down even briefly, intermittently repeat unwanted incorrect characters. I'm using a 2-year-old CoCo 2 with an FD501 controller and no other peripherals attached. This problem occurs both in the editor and the menu screens.

I've written to the author twice since testing this software on CoCo 2 models in two different Radio Shack stores, where it also exhibited this problem. Mr. van der Poel claims this is the only complaint of this nature he has received and could not duplicate the problem, even with a copy of my working disk. [See Bob van der Poel's letter in "Reviewing Reviews."]

He suggested that I may have a bad PIA, but why did the two newer computers I tested it on behave in the same manner? All my other software runs perfectly on this machine.

Has anyone else in the CoCo Community experienced this problem and if so, what did you do to solve it? I want to continue to use my CoCo 2, but if I can't get the best word processor program to work flawlessly on it, I will have to give it up.

Paul Cundle
P.O. Box 257
Blenheim, Ontario
Canada N0P 1A0

BOUQUETS

Editor:

I want to comment about the outstanding quality of service from hi-tech Stationery. The quality of the products and the wide selection, coupled with the wonderful touch of personally signed letters from the president of the company (to name just a few), make me want to order from them more often.

R. Harp
Dongola, IL

Personal Service

Editor:

Like most of your readers I purchase all of my software through companies that advertise in RAINBOW. Some of these companies do their job while others go out of their way.

I recently sent for a disk upgrade of my old *Grafplot* tape from Hawkes Research Services. After getting the disk and trying to get it to work with my screen print programs I soon gave up. My screen print programs simply would not work.

After calling Chris at Hawkes to see if he could help, we attempted to solve the problem over the phone. Without success, he then asked that I send my printer manual, screen print program and instruction sheet to him. In a week everything came back, including a modified *Grafplot* program that worked perfectly with my printer.

Chris went out of his way to help me, and I want to let others know what a reputable and considerate software house he runs!

Mark Perry
Northbrook, IL

Duck Delivers

Editor:

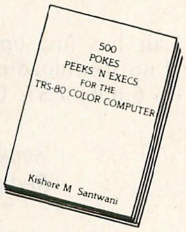
I want to highlight a new, unsung hero in this not-so-perfect world.

I have a monitor driver, three programs, and two rapid-fire circuits from Duck Productions. All materials came with excellent manuals or installation instructions. I have come to know when I order stuff from the Duck, I usually get more than I expect. I sent my first order by letter and promptly received my goodies. What's more, I also got information on all the other things they have, a free contest entry to win software, a coupon and a whole page of CoCo hints and tips.

My Class Monitor driver and Micro-Fire

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO



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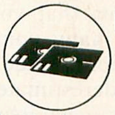

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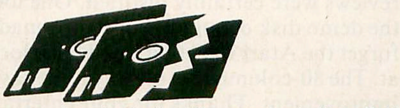

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Except NY. For information, technical information, NY orders & after-hours **1-716-223-1477** hardware mods were simply explained and worked great from the time I installed them. Likewise, the Duck's programs *Map 'n Zap*, *Micro-Fire* and *Keeping Track* are super programs to tame my CoCo.

My first order was a great deal. When I ordered again I forgot to send my coupon and they sent me a check for the discount with my order. Since then, I have been phoning them up direct. I noticed that Ian Millard was the guy who gave us *Writer Zap* in the September 1986 RAINBOW [Page 116]. What a gem! He's been very helpful, and not just about his own programs. Best of all, he honors his registered discount coupons over the phone. I'm looking forward to my next program from Duck Productions.

Richard Leach
Mississauga, Ontario

KUDOS

Editor:

I have just returned from a three-year tour overseas and would like to thank all of you for your magazine, my one contact with the CoCo world. With the folding of the three other major Color Computer magazines, I was beginning to dread the fate of our favorite machine. But then THE RAINBOW would arrive, and all was right in my world. Thank you RAINBOW from all of us who were, or are, far from home.

Clell A. Harmon
Wichita, KS

The Number One Source

Editor:

I have been a CoCo owner for two years now, and I had worked for Radio Shack for almost as long. Nowhere in Tandy Corp. did I find the amount of information for the CoCo that appears each month in the pages of RAINBOW magazine. Well done RAINBOW; long may your colors fly!

Alex Hahn
U. Montclair, NJ

CoCo 3 Draws Raves

Editor:

Three weeks ago I replaced my 'F' board CoCo with a CoCo 3. Wow, your rave reviews were certainly justified. One look at the demo disk on an RGB monitor made me forget the Atari 1040 that I had been looking at. The 80-column text display is my favorite improvement. Thanks for your entertaining and instructive approach to covering all aspects of CoCodom.

Bob Stephens
Courtenay, British Columbia

CoCo Cat Controversy

Editor:

I am against the abuse of illegal drugs. But it both shocked and annoyed me when I discovered CoCo Cat is now on the political soapbox and is no longer involved with computers. Come off it! Must everybody get into the act? Just because the anti-drug bandwagon is rolling, must CoCo Cat jump aboard?

I read CoCo Cat to find out about my computer and maybe have a little chuckle. In your January 1987 issue [Page 159], you have deprived me and other readers of that simple pleasure. Really, CoCo Cat was the only comic relief in your magazine, and now we have lost him to the world of politics.

Will CoCo Cat now be taking positions on gun control, illegal immigration, the Iran arms deal and everything else in the realm of politics? Not only did you give over the CoCo Cat comic itself to your current "cause," but I was further dismayed to see a half page [Page 25], in full color, along the same lines. In the future I wish you would do your editorializing in your editorials.

John Tiffany
Washington, D.C.

Editor:

I would like to extend my thanks for the no-nonsense stance that you have adopted with regards to drugs. I know that your magazine is eagerly read by many young people and the positive educational value of the CoCo Cat is not to be underestimated. Your concern with the broader social issues has always been evident and is to be commended.

Det. Daniel Montalvo
Baltimore, MD

Editor:

I would like to let you know that the CoCo Cat buttons were a big hit with my Brownies. They loved them and they say NO to drugs!

JoAnn Karaffa
Wilmerding, PA

BULLETIN BOARD SYSTEMS

- CoCo Jet BBS has been revised to run under my new JBBS 4.5 software. CoCo Jet features four subboards, an open public board, private mail for password users, downloads, a time and temperature module, 30/1200 baud, movie reviews, information on CoCo clubs, added features for password users, four access levels and much more.

CoCo Jet runs on a 64K CoCo 2, two 40-track drives and one 35-track drive, a multi-pack, RS-232 Deluxe Program Pak, precision time module, WCS temperature module and a Bell 212/A modem. The board runs 24 hours a day at (602) 969-8545. No password is needed, but more features are granted with a password and different access levels.

Dan Sobczak
Mesa, AZ

- Alitars Lair has just opened a CoCo message and up/downloading base. Hours are 6 p.m. to 6 a.m. PST. Call (916) 243-5856.

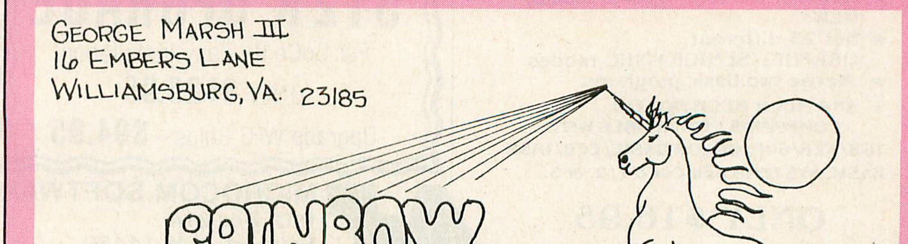
Sean McLeod
6908 Dennis Court
Redding, CA 96001

Continued on Page 162

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

Letters to the editors may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

ARTS AND LETTERS



Envelope of the Month

George Marsh, III
Williamsburg, VA

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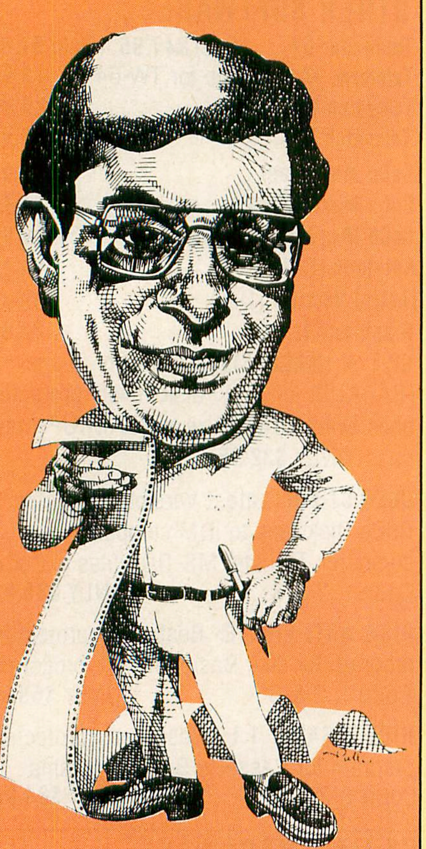


A Healthy CoCo for Years to Come

One of the recurring themes I am seeing, both from our mail as well as the numerous CoCo Club newsletters which come to us each month, is that of wondering just where the Color Computer 1 and CoCo 2 are now that we have a CoCo 3.

We've answered a lot of mail (and the newsletters keep restating the theme) saying the CoCo 1 and CoCo 2 are both alive and well. Yes, we're excited about the 3, as is most everyone else, but it would be foolish for us to forget that the vast number of Color Computers out there are 1s and 2s, and will be for a long time to come.

And, too, while there is a lot of talk and excitement about the 3 (for very good reasons), I happen to feel THE RAINBOW is more than able to support all the machines. We consider them all CoCos, and that is what we are here to do.

We will certainly see lots and lots of new stuff for the CoCo 3 — but I think there will be more new products for the 1 and 2 as well. The reason is simply that activity breeds more activity. As I have said many times, I think we'll see a healthy and growing CoCo market for years to come.

Incidentally, one of the places to see the first real evident interest in that market will probably be at RAINBOWfest in Chicago, April 10-12. The Princeton show was, of course, too soon after the introduction of the CoCo 3 for any products to really be available. But, I think there will be significant things on hand at Chicago — and the best of what will be new for the CoCo 1 and 2 as well. I hope you won't miss the show.

End of commercial.

* * *

One of the things I hear from a few people that, sometimes, makes me wonder is the complaint that there is little software yet for the CoCo 3; that the information is slow to come; that Tandy is dragging its heels on the machine.

Well, let's put this into perspective. Even though Tandy said it would be four to six weeks before the CoCo 3 was available (and they did run into some import problems that made it a bit later) on their late July announcement, let's, just for the sake of argument, consider that the CoCo 3 became available on August 1.

If you put this into the time frame of the original CoCo, in terms of the development of the machine and market, I, personally, as of right now, had been in possession of my original machine for a little over a month.

It was a 4K, non-Extended machine. I was "waiting" for a 16K upgrade (imagine that!) and Extended BASIC. Neither would arrive for a while yet.

> *"What I am suggesting is that the CoCo 3 be placed in the time frame of the original CoCo."*

At that stage, too, there were virtually no programs available, other than some ROM-Paks from Tandy. The first programs — from Computerware and The Micro Works — did not appear for a couple of months.

What I am suggesting is that the CoCo 3 be placed in the time frame of the original CoCo. If you do that, don't expect more than 4K until April and Extended BASIC until the end of May. The first third-party programs will be available sometime in July. A disk drive? By December.

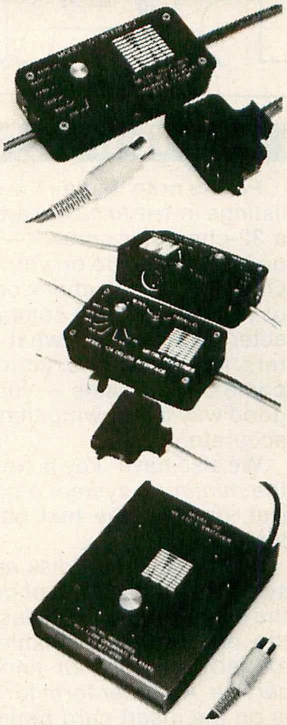
See what I mean?

Back when I was in college and took a course in Greek and Roman mythology from a Dr. Perry (a most charming and entertaining professor), one of the tales was of some goddess springing full-grown from Zeus' thigh. While I am sorry I don't recall which goddess it was (I don't think I remembered for the final exam, either) there does seem to be a parallel here: I think a lot of us expect to see all the body of programs for the CoCo 1 and 2 spring full-grown immediately for the CoCo 3.

Considering the time it has been available, I think the initial development of CoCo 3 programs is really pretty good. And, needless to say, I think it will be even better as time goes on. I look forward to seeing all those marvelous creations with you.

— **Lonnie Falk**

Metric Industries



Model 101 Interface $39.95

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). The 101 is only 4" × 2" × 1" and comes with all cables and connectors for your computer and printer.

The Model 104 Deluxe Interface $51.95

The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5" × 2.5" × 1.25" and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.

Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

Cassette Label Package $15.95

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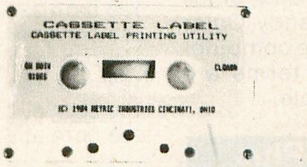
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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

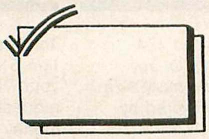
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into the CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip, which controls your computer.

When using an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN or EQUATE statement. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F80.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

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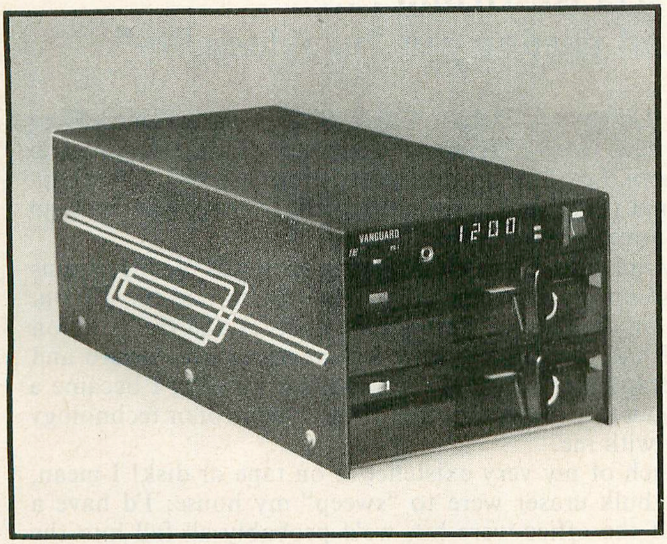

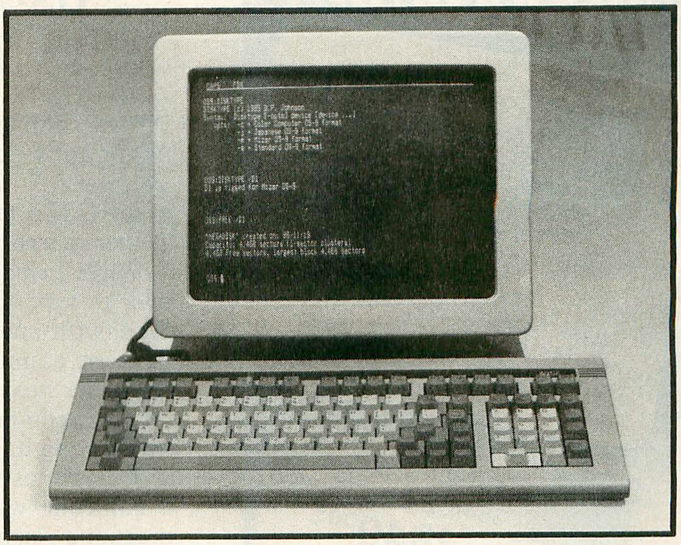

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BUILDING MARCH'S RAINBOW

Diet Smith was right . . .
OS-9 Users Re-Group . . .
. . . and pardon our "provinciality"

I was online to RAINBOW's Delphi CoCo SIG recently, using Greg Miller's great new *Greg-E-Term* to download Rick Adams' even newer *Rickeyterm*. I couldn't wait to get it, even though I have about every CoCo terminal program around. After all, *Rickeyterm* can send "super macros," a novel feature indeed.

While I was downloading, I was also copying some old record albums over to tape for use on my car stereo. By habit, I also had the TV on. Well, with one eye on the *Greg-E-Term* block counter and the other on the tape counter, I had one ear listening for the end of the record and the other hearing fragments of the TV program. Candidly, I became a bit frazzled and began to wonder whether I was in control or technology was having its way with me!

It seems as if much of my very existence is on tape or disk! I mean, if someone with a bulk eraser were to "sweep" my house, I'd have a magnetic seizure. If the office were hit, we'd probably all fall into the glitch and disappear. From my childhood, I recall Dick Tracy's buddy Diet Smith always proclaiming: "The nation that conquers magnetism will rule the universe!" While gravity was that cartoon prophet's obsession, those words have an Orwellian tone. A magnetic shield instead of a DEW line? ICBMs with giant bulk-eraser warheads? Hand grenades with "worm" programs? Well, effects of the EMP *are* a key concern of our national defense!

Ahem. Add a big grain of salt to all of the above while I make a hard copy (just in case). Speaking of printed material, did I tell you that Dale Puckett and Peter Dibble are doing a new RAINBOW guide — all about using OS-9 Level II on the CoCo 3. Look for it in late spring! And, speaking of OS-9, Tandy's Fran McGehee assures me at press time that Level II will be on the store shelves by February 15.

Also, just as we're sending this issue to the printer, Dale Puckett tells me that the OS-9 Users Group is making a big push "to get caught up" with all its activities and will soon resume publication of their *MOTD* newsletter. While President Brian Lantz has resigned for personal reasons due to a heavy workload as a church youth minister, Acting President Bill Turner has taken the reins and, Dale says, "Bill's digging in. He's called on the board of directors to help him and even his wife is pitching in." In addition to rekindling the newsletter, Bill has arranged for a private service to handle member mail. So, if you have pending correspondence, Dale suggests you might want to send a reminder to the new mailing address: *OS-9 Users Group, Suite R-237, 1715 East Fowler Avenue, Tampa, FL 33612*. An even quicker way to touch base and catch up on the latest developments is to check out OS-9 Online, RAINBOW's new OS-9 Special Interest Group on Delphi.

Briefly said, a deadline for entering the "Free the CoCo Three" contest I announced in our December issue: March 1. More than a half dozen different correct answers have emerged in entries from *most, but not all*, states and Canadian provinces. It was just an oversight on my part that I did not mention provinces when I said "first from every *state*." For that matter, overseas entries are, of course, being honored, too.

Concluding our "mail call," we like to think that THE RAINBOW has a certain magnetism of its own, but if you want a hard copy every month, a yearly subscription makes a fine backup to most any CoCo configuration!

— Jim Reed

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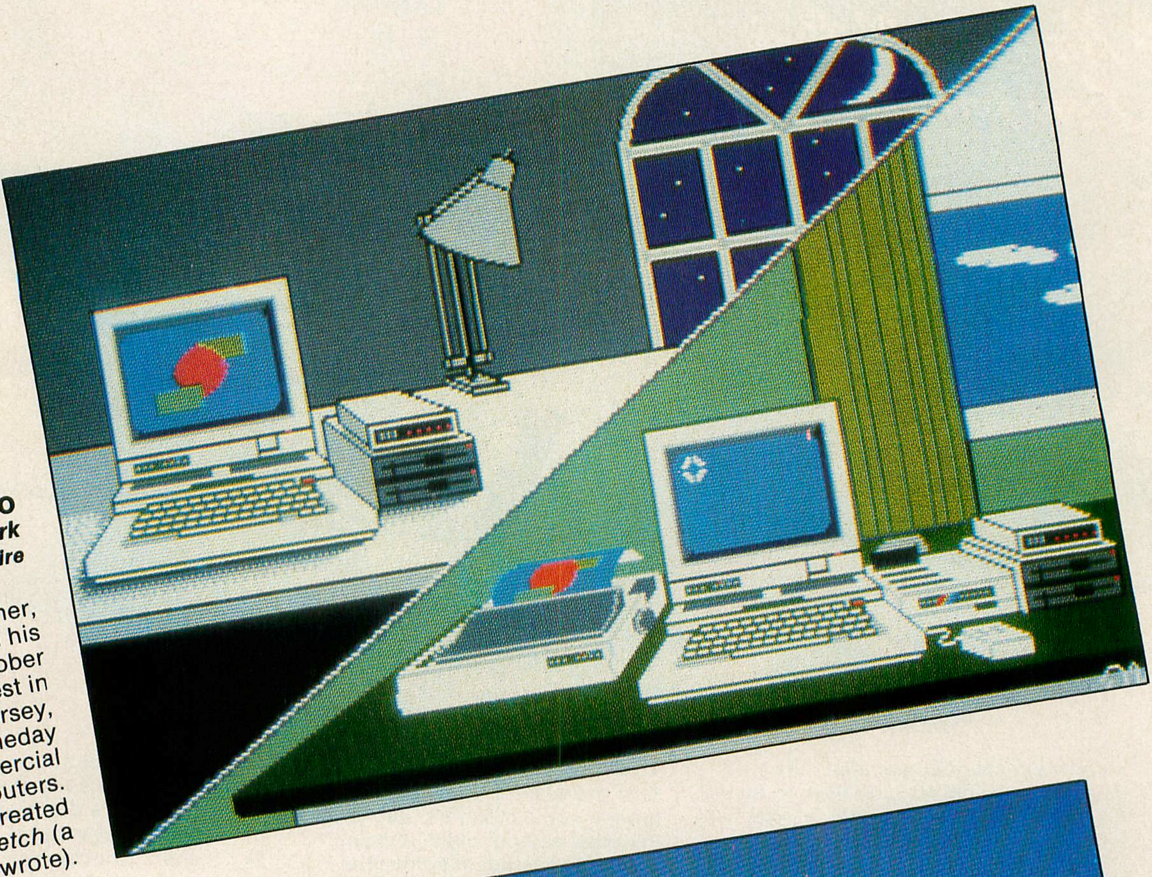
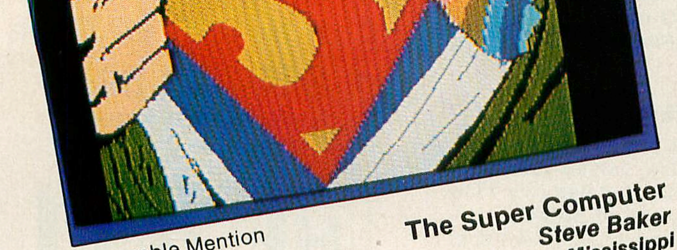
The CoCo Gallery



1

Telecoco
Daniel Van Buskirk
Sandown, New Hampshire

Our first place winner, Daniel, purchased his CoCo 3 at the October '86 RAINBOWfest in Princeton, New Jersey, and hopes to someday get a job in commercial art using computers. This graphic was created with *CoCo 3 Sketch* (a program he wrote).



Honorable Mention

The Super Computer
Steve Baker
Hattiesburg, Mississippi

Steve created this graphic with BASIC and utilized the X-pad and Speech/Sound cartridge. Steve is married and has three children. He collects comic books and enjoys role-playing games.

Honorable Mention

Lighthouse
Ray Larabie
White Lake, Ontario

Ray is 16 years old and lives on the lower part of the Madawasks River. He created this serene view with BASIC and a program he devised himself.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community!

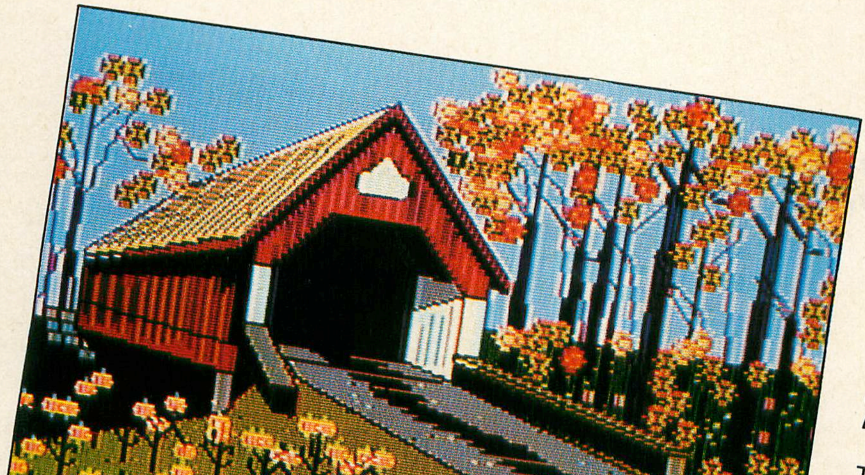
Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions will also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

Jody Doyle, Curator



2

Haupt's Mill Bridge

John Murvine
Ebensburg, Pennsylvania

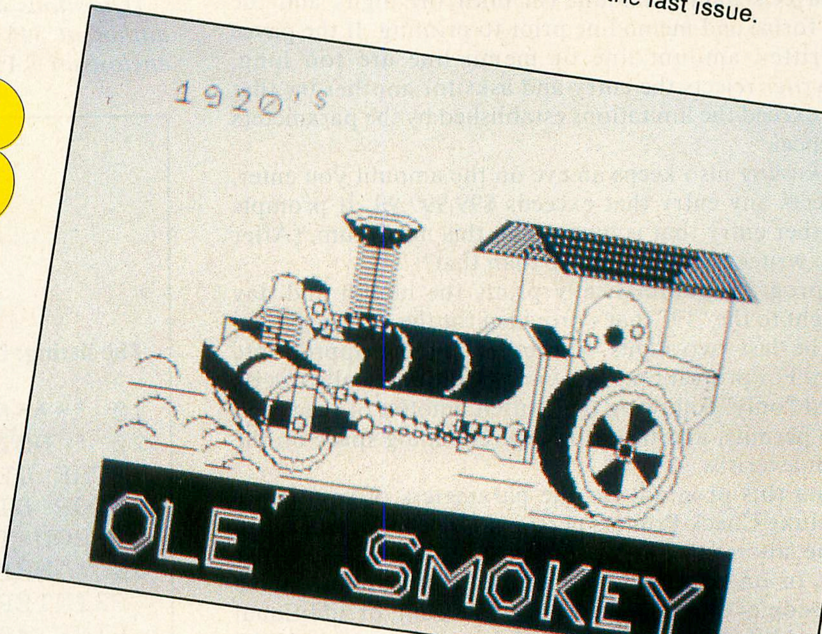
The second place winner is another exceptional graphic created with BASIC. The drawing is an autumn view of Haupt's Mill Bridge, which was built in 1872 in Bucks County, Pennsylvania. John is a self-taught programmer and commercial artist. Also, THE RAINBOW apologizes for misspelling Ebensburg in the last issue.

3

Ol' Smokey

C.W. Harriman
Bradford, Massachusetts

Third place winner, "Harry," as he likes to be called, created this 1920's version of the Ol' Smokey steamroller with BASIC. Harry is retired from the Western Electric Co. and finds CoCoing a very exciting way of passing the hours.



FINANCE

16K
ECB

Check It Out

By Robert A. Green

Here is a program I believe many RAINBOW readers will find useful. It provides a fast and easy printed personal-sized check, is simple to use, and offers a number of "foolproof" features.

Checkwriter makes it easy to correct any mistakes in the date, payee's name, amount (in both the digits and the written form) and memo line prior to printing. If the payee line, written amount line or memo line are too long, *Checkwriter* rejects the entry and asks for another try that doesn't exceed the limitations established by the parameters of the check.

Checkwriter also keeps an eye on the amount you enter, and rejects any entry that exceeds $99,999.99. It prompts for another entry that is lower than this maximum. (After all, who writes checks for more than that?)

The program automatically prints the month and day flush-right to the "19" that's provided for the year, and then prints the last two digits of the year in the appropriate location. For protection, *Checkwriter* automatically inserts the word "only" following the written amount of the check if space permits, and then fills any remaining space on the line with asterisks.

I wrote this program for the parameters of commonly used Deluxe Check Printers personal-size checks, but it can easily be altered to print correctly on checks by other printers, or on larger business checks. You can also make multiple copies of the same check if you want, or additional checks to different payees in differing amounts with the same date, without entering the date each time.

After you have entered the program, put a blank sheet of paper in your printer, align the top edge with the top of the printer head, and run it. If you are not using a Gemini-10X printer, delete Line 330, which contains the code to disregard the "paper out" signal you get with small paper like a check. You may need to replace this code with one that is appropriate for your printer.

(Questions about this program may be directed to the author at 346 Crest Drive, Whitehall, PA 18052. Please enclose an SASE for a response.) ☐

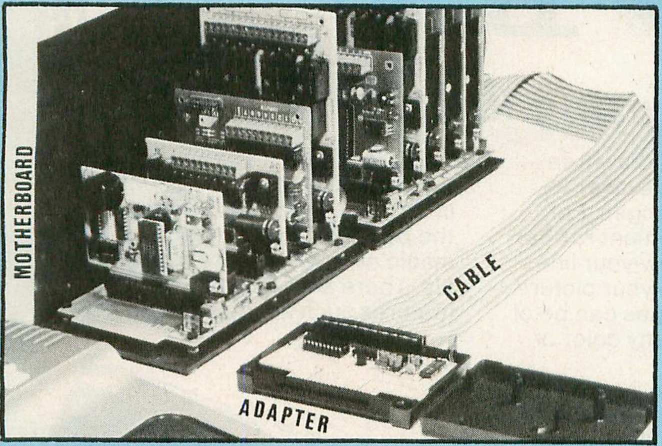
120	26
270	249
410	88
END	66

The listing: CHEKRITR

```
10 '*****************************
20 ' NOTE: THIS PROGRAM IS USES
  THE GEMINI-10X PRINTER CODE
  FOR DISREGARDING THE SIGNAL
  FROM THE "PAPER-OUT" DETECTOR.
30 ' WHEN USING A DIFFERENT
 PRINTER YOU MAY NEED TO REMOVE
 LINE #330 OR REPLACE IT WITH
 YOUR PRINTER'S APPROPRIATE
 CODE.
40 '*****************************
```

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

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Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

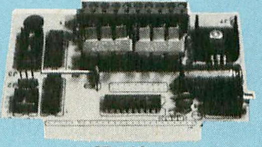
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder PH-145: $79

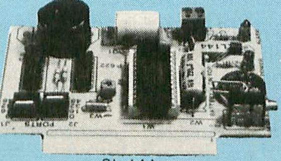
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card PR-152: $15

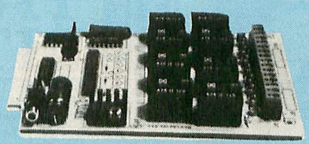
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



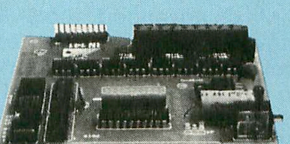
ST-143



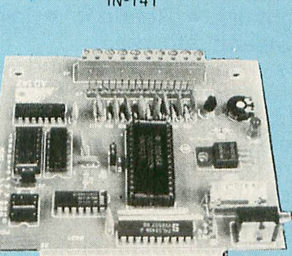
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

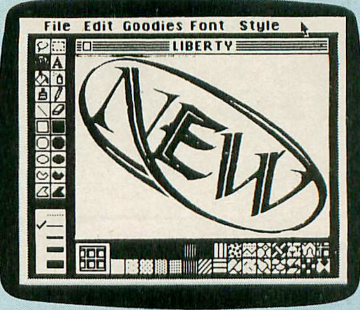
- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA Products
a division of Sigma Industries, Inc.
242 W. Avenue, Darien, CT 06820

Technical info: (203) 656-1806
Orders only Except in NY 800 221-0916
New York orders: (718) 296-5916
All lines open weekdays 9 to 5 Eastern time

CoCo Max™ II



You'll use it all the time and love using it.

What is CoCo Max ?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.

CoCo Max disk system, with Y-cable.

Is CoCo Max for you ?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success ?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

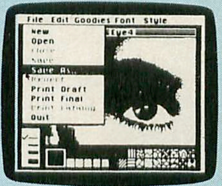
With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubberbanding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

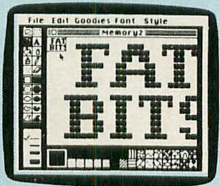
For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom in !

Control Over Your Work

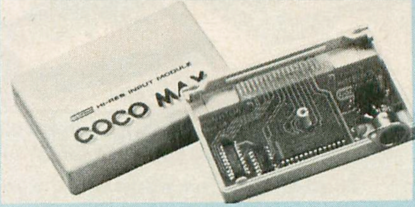
CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats: ● You can move it around ● Copy it ● Shrink or enlarge it in both directions ● Save it on the electronic ***Clipbook*** ● Flip it vertically or horizontally ● Rotate it ● Invert it ● Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color !

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso***.



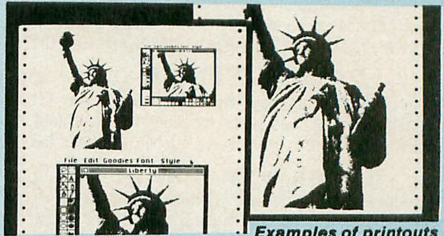
Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack ?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles !


File Edit Goodies Font Style
Liberty
Examples of printouts

Printing Your Creations

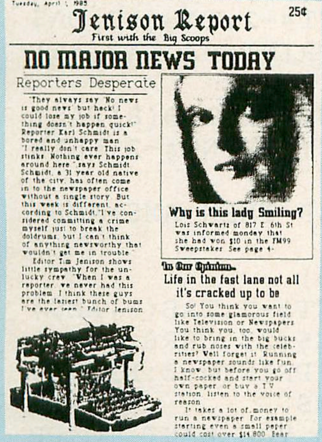
There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers !

All the CoCo Max pictures are **unretouched** screen shots or printouts (Epson RX-80).

CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

All these pictures are **unretouched** screen photos or printouts (on an Epson RX-80).


Tuesday, April 1, 1985

Jenison Report 25¢

First with the Big Scoops

NO MAJOR NEWS TODAY

Reporters Desperate

"They always say 'No news is good news' but heck! I could lose my job if something doesn't happen quick!" Reporter Karl Schmidt is a bored and unhappy man. "I really don't care. This job stinks. Nothing ever happens around here," says Schmidt. Schmidt, a 31 year old native of the city, has often come in to the newspaper office without a single story. But this week is different, according to Schmidt."I've considered committing a crime myself just to break the doldrums, but I can't think of anything newsworthy that wouldn't get me in trouble."

Editor Tim Jenison shows little sympathy for the unlucky crew. "When I was a reporter, we never had this problem. I think these guys are the laziest bunch of bums I've ever seen," Editor Jenison

Why is this lady Smiling?

Lois Schwartz of 817 E. 6th St. was informed monday that she had won $10 in the FM99 Sweepstakes. See page 4-

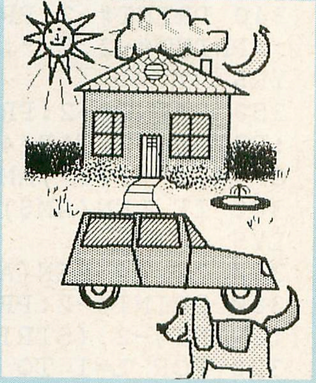
In Our Opinion...

Life in the fast lane not all it's cracked up to be

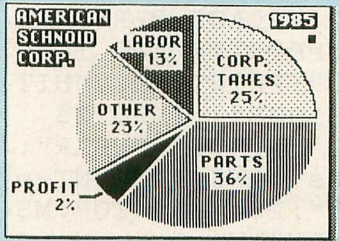
So! You think you want to go into some glamorous field like Television or Newspapers. You think you, too, would like to bring in the big bucks and rub noses with the celebrities? Well forget it. Running a newspaper sounds like fun, I know, but before you go off half-cocked and start your own paper, or buy a T.V. station, listen to the voice of reason.

It takes a lot of money to run a newspaper. For example starting even a small paper could cost over $14,800. Bear

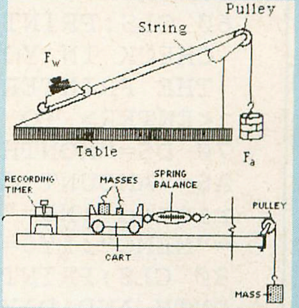
① **Publish a newsletter or bulletin**



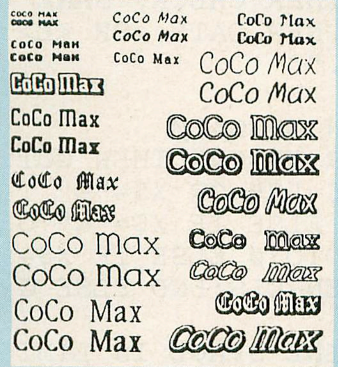
② **Fun for children while stimulating creativity.**



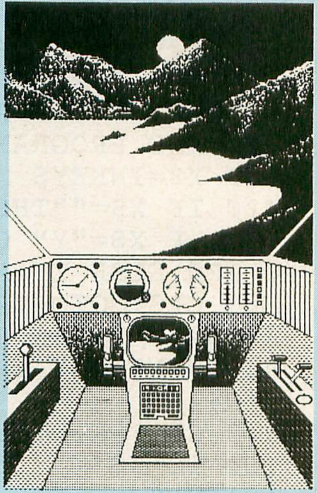
③ **Business graphs, charts, diagrams. Also memos**



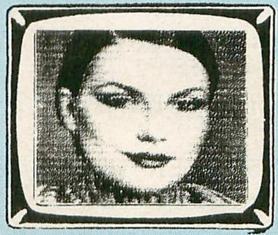
④ **Junior's homework and science projects. Term papers too!**



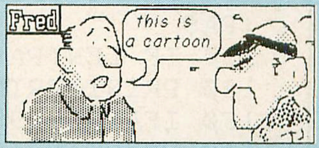
⑤ **Over 200 typestyles to choose from! generate flyers.**



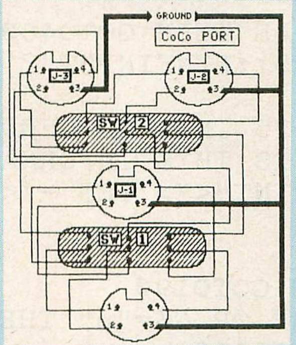
⑥ **A new way to express your imagination.**



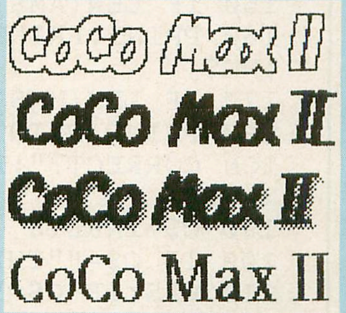
⑦ **Video portrait (with optional digitizer).**



⑧ **This is a cartoon.**



⑨ **schematics and floor plans.**



⑩ **Logos and letterheads.**

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (The koala pad and the track ball work, but are not recommended.)
Disk systems need a Multi-Pak or our Y-Cable.
CoCo Max is compatible with any Radio Shack DOS and ADOS.
Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics.* Also, it has 5 fonts instead of 14.
CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC printers, Gorilla Banana.
Color printing: CGP-200, CGP-115

Pricing

CoCo Max on tape with Hi-Res Pack and manual.	$69.95
CoCo Max II (disk only) with Hi-Res Pack and manual.	$79.95
Upgrade: CoCo Max to CoCo Max II New disk and manual.	$19.95
New features of CoCo Max II: 14 fonts and glyphic font, dynamic shrink and stretch, rotate, multiple drive capability, 68 page scrapbook, point and click file load, color printer drivers, full error reporting.	
Upgrade: CoCo Max tape to disk manuals, disk and binder	$24.95
Y-Cable: *Special Price*	$19.95
Super Picture Disks #1, #2, and #3	each: $14.95
All three picture disks	$29.95

Guaranteed Satisfaction
Use CoCo Max for a full month.
If you are not delighted with it,
we will refund every penny.

Font Editor Option

A font is a set of characters of a particular style. CoCo Max includes 15 fonts. You can create new fonts of letters, or even symbols or graphics with the font editor. Examples: set of symbols for electronics, foreign alphabets, etc. $19.95

Video Digitizer DS-69

This new Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69 you will be able to digitize and bring into CoCo Max a frame from any video source: VCR, tuner, or video camera. Comes complete with detailed manual and C-SEE software on disk. Multi-Pak is required.

New Low Price Save $50	$99.95
New: faster DS-69A	$149.95

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Woodhaven, NY 11421

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C.O.D. add $3.00 extra.
NY and CT : add sales tax.
Shipping to Canada is $5.00
Overseas, FPO, APO add 10%

```
50 CLS:PRINT@133,"personal check
 printer":PRINT@205,"BY":PRINT@2
63,"ROBERT A. GREEN":PRINT@326,"
SEPTEMBER 30, 1986":FOR Z=1TO200
0:NEXTZ
60 CLS:PRINT@162,"PLACE PERSONAL
 CHECK IN YOUR  PRINTER AND TURN
 THE PRINTER ON.":PRINT@290,"HIT
 <ENTER> TO CONTINUE";:INPUTZ$
70 D$="MONTH AND DAY":Y$="YEAR":
A$="AMOUNT-digits":AW$="AMOUNT-p
rinted":N$="NAME":P$="PAY TO":M$
="MEMO":LY$=" ONLY":NL=0
80 CLS:PRINT"ENTER THE CURRENT M
ONTH AND DAY";:INPUTDA$
90 PRINT:PRINTY$;:LINEINPUT"? ";
YR$
100 PRINT:PRINTP$;:LINEINPUT"? "
;PA$
110 IF LEN(PA$)>35 THEN GOTO440
120 PRINT:PRINTA$;:INPUTAM
130 IFAM>99999.99 THEN GOTO460
140 PRINT:PRINTAW$;"?":LINEINPUT
"";AM$
150 IF LEN(AM$)>45 THEN GOTO480
160 PRINT:PRINTM$;:LINEINPUT"? "
;MM$
170 IF LEN(MM$)>25 THEN GOTO500
180 PRINT:PRINT"IS THIS INFORMAT
ION CORRECT?":PRINT"<Y> YES - <N
> NO";
190 C$=INKEY$
200 IF C$=""THEN GOTO190
210 CLS:IF C$="N" OR C$="n" THEN
 GOTO220 ELSE GOTO320
220 PRINT"1 ";D$,DA$:PRINT"2 ";Y
$,YR$:PRINT"3 ";P$,PA$:PRINT"4 "
;A$,AM:PRINT"5 ";AW$:PRINTAM$:PR
INT"6 ";M$,MM$
230 PRINT:PRINT"WHICH LINE IS IN
CORRECT":INPUTNL:IF NL>6 THEN GO
TO230
240 PRINT:PRINT"ENTER CORRECT"
250 IF NL=1 THEN PRINTD$;:INPUTD
A$
260 IF NL=2 THEN PRINTY$;:INPUTY
R$
270 IF NL=3 THEN PRINTN$;:INPUTP
A$:IF LEN(PA$)>35 THEN GOTO440
280 IF NL=4 THEN PRINTA$;:INPUTA
M:IF AM>99999.99 THEN GOTO460
290 IF NL=5 THEN PRINTAW$;:INPUT
AM$:IFLEN(AM$)>45 THEN GOTO480
300 IF NL=6 THEN PRINTM$;:INPUTM
M$:IF LEN(MM$)>25 THEN GOTO500
310 CLS:PRINTD$,DA$:PRINTY$,YR$:
PRINTP$,PA$:PRINTA$,AM:PRINTAW$:
PRINTAM$:PRINTM$,MM$:GOTO180
320 CLS:PRINT@170,"PRINTING":YR$
=RIGHT$(YR$,2):LL=LEN(DA$):AD=43
-LL
330 PRINT#-2,CHR$(27) CHR$(56)
340 PRINT#-2:PRINT#-2,TAB(AD)DA$
;:PRINT#-2,",";:PRINT#-2,TAB(46)
YR$
350 PRINT#-2:PRINT#-2,TAB(8)PA$;
:PRINT#-2,TAB(45);:PRINT#-2,USIN
G"**,###.##";AM
360 IF LEN(AM$)<39 THEN AM$=AM$+
LY$
370 ZZ=44-LEN(AM$)
380 PRINT#-2:PRINT#-2,TAB(1)AM$;
:PRINT#-2,(STRING$(ZZ,CHR$(42)))
390 FOR L=1 TO 4:PRINT#-2:NEXTL:
PRINT#-2,TAB(5)MM$
400 PRINT@160,"DO YOU WANT TO PR
INT ANOTHER    COPY OF THE SAME
CHECK?":PRINT:PRINT"HIT <Y> IF Y
ES, <S> FOR ANOTHER CHECK, SAME
DATE, <N> FOR A NEW DATE, OR <E>
 TO END PROGRAM."
410 X$=INKEY$
420 IF X$=""THEN GOTO410
430 IF X$="Y" OR X$="y" THEN GOT
O 320 ELSE IF X$="S" OR X$="s" T
HEN CLS:GOTO100 ELSE IF X$="N" O
R X$="n" THEN GOTO70 ELSE IF X$=
"E"OR X$="e" THEN CLS:END ELSE G
OTO410
440 CLS:PRINT"LINE SPACE IS LIMI
TED TO 35     CHARACTERS -- TRY
AGAIN."
450 IF NL=3 THEN GOTO270 ELSE GO
TO100
460 CLS:PRINT"AMOUNT OF CHECK IS
 LIMITED TO   $99,999.99 IN THIS
 PROGRAM  --  -- TRY AGAIN."
470 IF NL=4 THEN GOTO280 ELSE GO
TO120
480 CLS:PRINT"SPACE FOR THE WRIT
TEN AMOUNT IS LIMITED TO 45 CHAR
ACTERS   --    -- TRY AGAIN."
490 IF NL=5 THEN GOTO290 ELSE GO
TO140
500 CLS:PRINT"SPACE FOR THE MEMO
 IS LIMITED TO25 CHARACTERS -- T
RY AGAIN.":PRINT
510 IF NL=6 THEN GOTO300 ELSE GO
TO160
```

Only NRI teaches you to service all computers as you build your own fully IBM-compatible microcomputer

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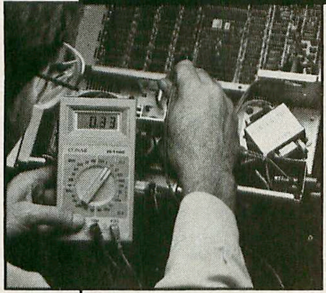

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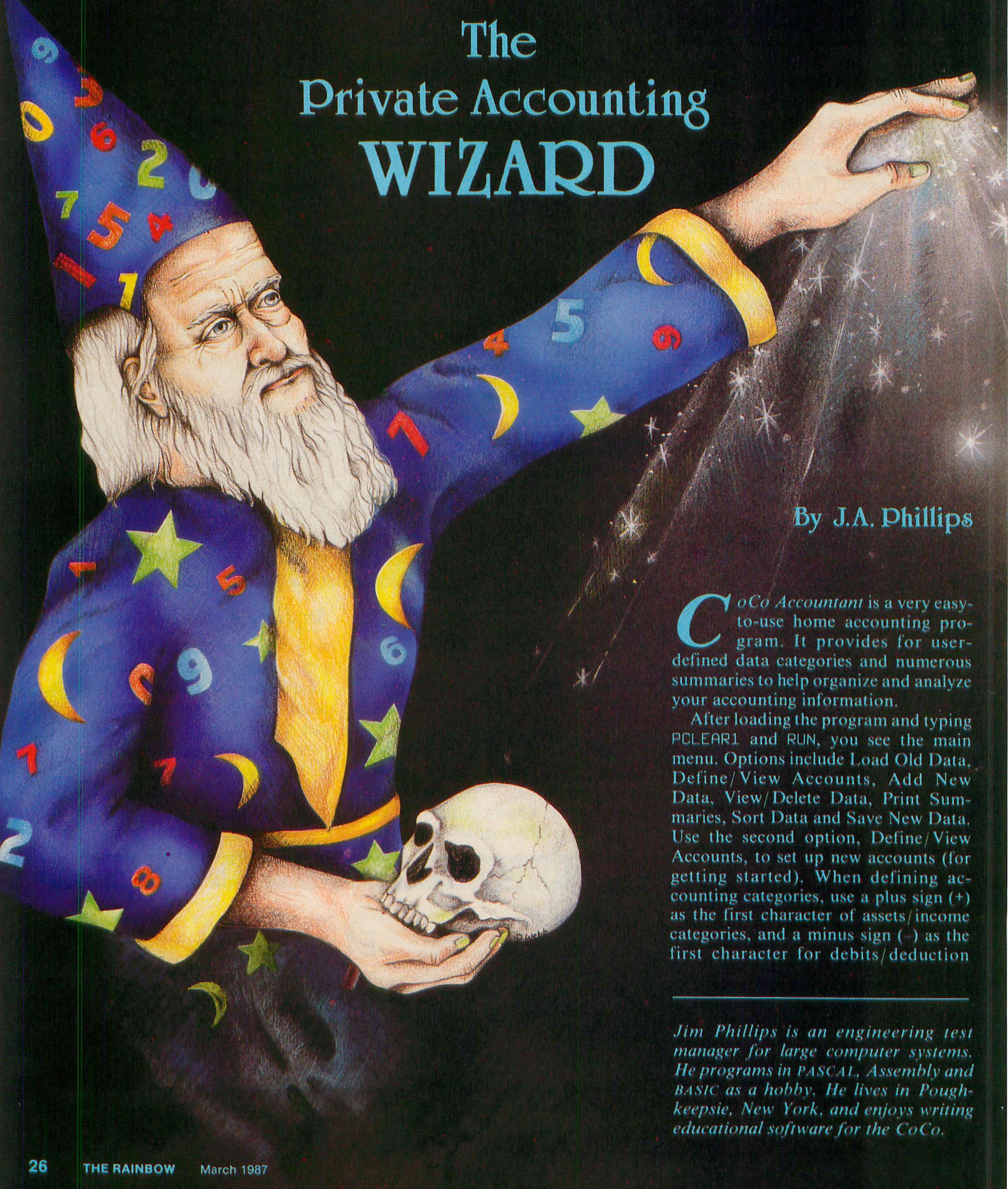


By J.A. Phillips

CoCo Accountant is a very easy-to-use home accounting program. It provides for user-defined data categories and numerous summaries to help organize and analyze your accounting information.

After loading the program and typing `PCLEAR1` and `RUN`, you see the main menu. Options include Load Old Data, Define/View Accounts, Add New Data, View/Delete Data, Print Summaries, Sort Data and Save New Data. Use the second option, Define/View Accounts, to set up new accounts (for getting started). When defining accounting categories, use a plus sign (+) as the first character of assets/income categories, and a minus sign (–) as the first character for debits/deduction

---

Jim Phillips is an engineering test manager for large computer systems. He programs in PASCAL, Assembly and BASIC as a hobby. He lives in Poughkeepsie, New York, and enjoys writing educational software for the CoCo.

32K Disk | **16K ECB Mod.**

categories. Using these symbols allows automatic net calculations at various points in the *CoCo Accounting* program. Categories that do not begin with a plus or minus sign are excluded from net calculations, but are included in all other summary tracking reports.

Use Option 3 to add new data. This option is designed to be used on a monthly basis. Upon entry, it asks for the month and assumes all data entered thereafter is for the same month. To add data for a different month, simply use `CLEAR` to return to the previous menu and reenter Option 3. This is where you create the database from which all other information is derived. You may enter a brief description and dollar amount for any account.

Option 4 is used to view the database and to delete any entries. A deleted entry will appear in the database with `DELETED` as its description, but will not be printed to tape/disk or printer, or used in any calculations. Thus, when saving the database to tape or disk, the entry is, in fact, deleted.

If an error is made in data entry using Option 3, use Option 4 to delete the incorrect information and go back to Option 3 to enter the correct information.

Sort Data is used to sort the database by month or account. This will make it easier for you to locate a particular entry. A 64K machine holds 360 entries. For a 16K machine, change Line 40 to `E=120` and Line 30 to `CLEAR 2000`. It will hold approximately 120 entries.

Option 3 gives the totals of any account over the 12 month period. Monthly Nets, Option 4, gives the nets for each of the 12 months based on the way you defined your accounts (with + or -) at setup.

The strength of the program is Option 5, Print Summaries. Upon entering this option, you are presented with a menu from which you select information to be displayed to the screen, printer, or both. The options include Year-to-Date Account Totals, One Month Account Totals, Single Account Summary, Monthly Nets, Account Data (Printer), Account Names (Printer) and Main Menu. The first and second options also give nets. All screen outputs can be printed by pressing P (as indicated at the bottom of the screens).

The last two choices are for printer output only. Account Date would be very useful for income tax records. It prints out all items in the database assigned to a particular account so you can see where the year-to-date total came from. Account Names, Option 6, prints out a handy cross reference to the main menu account code letters.

For Tape Systems

To allow the *CoCo Accountant* to be used with cassette tape systems, make the following changes:

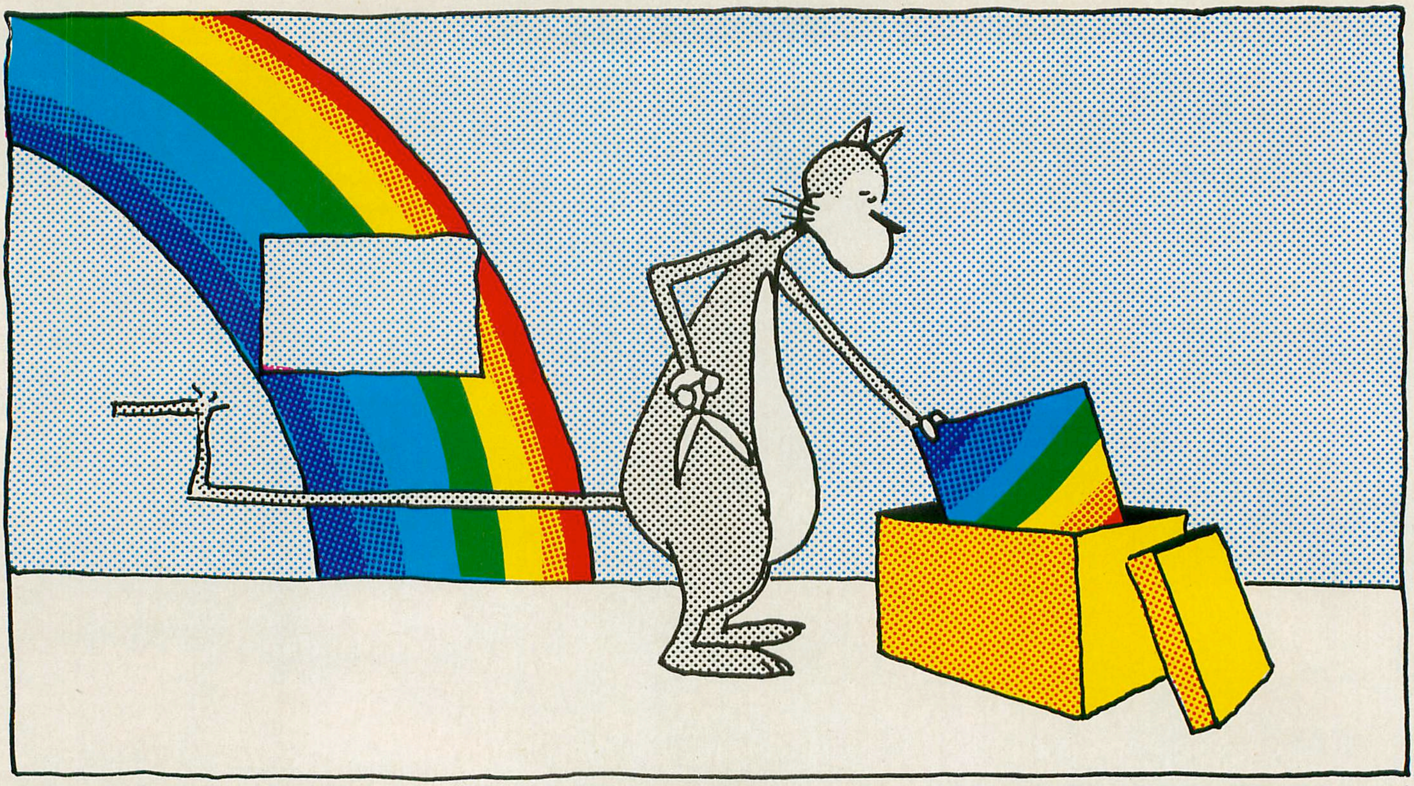
```
205 PRINT@196, ‘‘REWIND TAPE -
PRESS PLAY’’
230 OPEN‘‘I’’,#-1,‘‘ACCOUNT’’
240 INPUT#-1,A1$(I)
250 IF EOF(-1)THEN 270
255 INPUT#-1,D$(N,1)
256 INPUT#-1,D$(N,2)
257 INPUT#-1,D(N,1)
258 INPUT#-1,D(N,2)
300 CLOSE#-1:GOTO100
1905 PRINT@194,‘‘REWIND TAPE -
PRESS PLAY & RECORD’’
1930 OPEN‘‘O’’,#-1,‘‘ACCOUNT’’
1940 PRINT#-1,A1$(I)
1955 PRINT#-1,D$(N,1)
1956 PRINT#-1,D$(N,2)
1957 PRINT#-1,D(N,1)
1958 PRINT#-1,D(N,2)
1965 CLOSE#-1:GOTO100
```

(You may address questions about this program to Mr. Phillips at 12 Wilbur Blvd., Poughkeepsie, NY 12603. Please enclose an SASE for a reply.) ☐

The listing: `ACCOUNT`

115	221	1286	124
255	11	1345	127
485	150	1620	45
790	154	1760	7
1039	48	2010	45
1135	220	2195	242
1240	140	END	235

```
1 CLS:PRINT@232,"COCO ACCOUNTANT
"
2 'J.A.PHILLIPS
3 '12 WILBUR BLVD.
4 'POUGHKEEPSIE, NY 12603
5 '3/8/84
10 GOTO30
12 CLS:PRINT@231,"SORTING ENTRY
#"N:RETURN
15 CLS:PRINT@230,"MAX OF "E" ENT
RIES":FORJ=1TO1000:NEXT
17 GOTO100
30 CLEAR 7000
40 E=360
50 DIMD$(E+1,2):DIMD(E+1,2):DIMA
$(26):DIMA1$(26):DIMY$(2):DIMY(2
):DIMT(26):DIM MT(12)
60 DE$="==(DELETED)=="
70 A2$=STRING$(8,".")
75 S$=STRING$(31," ")
80 FORI=1TO26
82 A$(I)=CHR$(64+I)
84 A1$(I)=A2$
86 NEXT
90 FORX=1TO200:NEXT
100 CLS:PRINT@72,"COCO ACCOUNTAN
T"
105 PRINT@132,"<1> LOAD OLD DATA
"
```



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```
110 PRINT@164,"<2> DEFINE/VIEW A
CCOUNTS"
115 PRINT@196,"<3> ADD NEW DATA"
120 PRINT@228,"<4> VIEW/DELETE D
ATA"
125 PRINT@260,"<5> PRINT SUMMARI
ES"
130 PRINT@292,"<6> SORT DATA"
135 PRINT@324,"<7> SAVE NEW DATA
"
140 PRINT@388,"ENTER <1-7>";:INP
UTQ
145 IFQ>7ORQ<1THEN100
150 ON Q GOTO200,1300,400,700,10
00,1600,1900
200 CLS:N=1
205 PRINT@196,"INSERT DATA DISK
NOW"
210 PRINT@228,"PRESS <ENTER> TO
LOAD"
215 PRINT@260,"OR ENTER <M>ENU
";:LINEINPUTQ$
220 IFQ$<>""ANDQ$<>"M"THEN200
225 IFQ$=""THEN230ELSE100
230 OPEN "I",#1,"ACCOUNT/DAT"
235 FOR I=1TO26
240 INPUT#1,A1$(I)
245 NEXT
250 IF EOF(1)THEN270
255 INPUT#1,D$(N,1)
256 INPUT#1,D$(N,2)
257 INPUT#1,D(N,1)
258 INPUT#1,D(N,2)
260 N=N+1:GOTO250
270 FOR I=N TO E
280 D$(I,1)="":D$(I,2)="":D(I,1)
=0:D(I,2)=0
290 NEXT
300 CLOSE#1:GOTO100
400 N=1
405 IFD$(N,2)=""THEN415
410 N=N+1:GOTO405
415 IF N>E THEN15
420 CLS:PRINT@228,"ENTER MONTH <
1-12>";:INPUTQ
425 IFQ<1ORQ>12THEN420
430 M=Q
435 D(N,1)=M
440 A=1:GOTO1305
445 D$(N,1)=A$(I)
450 CLS:PRINT@68,"ACCOUNT DATA E
NTRY #";N
455 PRINT@129,"MONTH = ";D(N,1)
457 PRINT@141,"ACCOUNT = ";A1$(I
)
460 PRINT@193,"DESCRIPTION = ";:
LINEINPUTQ$
470 IFQ$<>""THEN475
472 D$(N,2)="NONE":GOTO480
475 D$(N,2)=LEFT$(Q$,14)
480 PRINT@193,S$
485 PRINT@193,"DESCRIPTION = ";D
$(N,2)
490 PRINT@257,"AMOUNT = ";:INPUT
Q
500 D(N,2)=Q
505 N=N+1:IF N>E THEN 15
510 GOTO 435
700 N=1
705 CLS:PRINT " #   M A DESCRIPT
ION     AMOUNT"
710 FORI=1TO13
715 IFD$(N,2)=""THEN 770
720 PRINT USING"###";N;:PRINT TA
B(4);:PRINT USING"##";D(N,1);:PR
INT TAB(7);
730 PRINTD$(N,1);TAB(9);
740 PRINT USING"%            %";
D$(N,2);:PRINT TAB(24);
750 PRINT USING"####.##";D(N,2)
760 N=N+1
765 NEXT
770 PRINT@450,"<ENTER>=SCROLL
<999>=QUIT"
775 PRINT@482,"<ENTRY#>=VIEW/DEL
ETE";:INPUTQ
777 IFD$(N,2)=""THEN N=1
780 IFQ=999THEN100
785 IF Q>E THEN15
790 IFQ=0THEN705
792 CLS:PRINT@75,"ENTRY #"Q
793 PRINT@131,"DESCRIPTION: "D$(
Q,2)
794 PRINT@230,"<D>ELETE OR <V>IE
W"
795 Q$=INKEY$:IFQ$<>"D"ANDQ$<>"V
"THEN795
796 IFQ$="D"THEN800
798 N=Q:GOTO705
800 D$(Q,2)=DE$:N=Q
810 GOTO705
1000 CLS:N=1
1005 PRINT@73,"PRINT OPTIONS"
1010 PRINT@132,"<1> Y-T-D ACCOUN
T TOTALS"
1015 PRINT@164,"<2> 1-MONTH ACCO
UNT TOTALS"
1017 PRINT@196,"<3> SINGLE ACCOU
NT SUMMARY"
1019 PRINT@228,"<4> MONTHLY NETS
"
1020 PRINT@260,"<5> ACCOUNT DATA
 (PRINTER)"
1025 PRINT@292,"<6> ACCOUNT NAME
S(PRINTER)"
1027 PRINT@324,"<7> MAIN MENU"
```

```
1030 PRINT@388,"ENTER <1-7>";:IN
PUTQ
1035 IFQ<1ORQ>7THEN1000
1036 ON Q GOTO1040,1038,2100,225
0,1180,2000,100
1038 CLS:PRINT@228,"ENTER MONTH
<1-12>";:INPUTM1
1039 IF M1<1ORM1>12THEN1038
1040 CLS:PRINT@227,"CALCULATING
ACCOUNT TOTALS"
1050 Z=0
1055 FOR I=1TO26:T(I)=0:NEXT
1065 IFD$(N,2)=""THEN1100
1072 IFQ=2AND D(N,1) <> M1 THEN1
095
1073 IFD$(N,2)=DE$THEN1095
1080 I=ASC(D$(N,1))-64
1090 T(I)=T(I)+D(N,2)
1095 N=N+1:GOTO1065
1100 CLS
1105 IFQ=1THENPRINT#-Z,TAB(6);"Y
EAR-TO-DATE TOTALS"
1108 IFQ=2THENPRINT#-Z,TAB(9);"M
ONTH"M1"TOTALS"
1110 IFZ=2THENPRINT#-Z
1115 FOR I=1TO13
1120 PRINT#-Z,TAB(3);A$(I);TAB(6
);
1125 PRINT#-Z,USING"######.##";T
(I);
1130 PRINT#-Z,TAB(17);A$(I+13);T
AB(20);
1135 PRINT#-Z,USING"######.##";T
(I+13)
1140 NEXT
1145 IF Z=2THENPRINT#-Z ELSE1155
1150 PRINT#-Z:GOTO1160
1155 PRINT@483,"<P>RINT OR <M>EN
U OR <N>ET";
1160 Q$=INKEY$:IFQ$<>"P"ANDQ$<>"
M"ANDQ$<>"N"THEN1160
1165 IFQ$="M"THEN1000
1167 IFQ$="N"THEN1250
1170 Z=2:GOTO1105
1180 P=1:GOTO1305
1184 CLS:PRINT@226,"PRINTING DAT
A FOR ACCOUNT ";A$(I)
1185 N=1
1190 PRINT#-2,TAB(11);A$(I)"="A1
$(I):PRINT#-2
1195 PRINT#-2,"MONTH";TAB(8);"DE
SCRIPTION";TAB(23);"  TOTAL"
1200 IFD$(N,2)=""THEN1235
1202 IFD$(N,2)=DE$THEN1230
1210 IFD$(N,1)<>A$(I)THEN1230
1215 PRINT#-2,USING"###";D(N,1);
1216 PRINT#-2,TAB(8);
1220 PRINT#-2,USING"%
%";D$(N,2);
1221 PRINT#-2,TAB(23);
1225 PRINT#-2,USING"####.##";D(N
,2)
1230 N=N+1:GOTO1200
1235 PRINT#-2:PRINT#-2
1240 GOTO1180
1250 Z=0:T1=0:T2=0:T3=0
1252 FOR I=1TO26
1254 IFLEFT$(A1$(I),1)="-"THENT2
=T2+T(I)
1256 IFLEFT$(A1$(I),1)="+"THENT1
=T1+T(I)
1260 NEXT
1262 T3=T1-T2
1264 CLS
1266 IFZ=0THENPRINT
1268 IFQ=1THENPRINT#-Z,TAB(8);"Y
EAR-TO-DATE NET"
1270 IFQ=2THENPRINT#-Z,TAB(10);"
MONTH"M1"NET"
1272 PRINT#-Z
1274 PRINT#-Z,TAB(5);"INCOME";TA
B(18);
1276 PRINT#-Z,USING"######.##";T
1
1278 PRINT#-Z,TAB(5);"DEBITS";TA
B(18);
1280 PRINT#-Z,USING"######.##";T
2
1282 PRINT#-Z,TAB(18);STRING$(9,
"-")
1284 PRINT#-Z,TAB(5);"NET";TAB(1
8);
1286 PRINT#-Z,USING"######.##";T
3
1288 PRINT#-Z:PRINT#-Z:IFZ=2THEN
1294
1290 PRINT@294,"<P>RINT OR <R>ET
URN"
1292 PRINT@353,"NOTE: YOU CAN DE
CLARE ACCOUNTS":PRINT@385,"AS IN
COME/DEBITS BY PLACING A":PRINT@
417,"+/- IN THE FIRST CHARACTER
OF"
1293 PRINT@449,"THE ACCOUNT NAME
 USING OPTION":PRINT@481,"<2> OF
 THE MAIN MENU.";
1294 Q$=INKEY$:IFQ$<>"P"ANDQ$<>"
R"THEN1294
1296 IFQ$="R"THENZ=0ELSE1298
1297 GOTO1100
1298 Z=2:GOTO1266
1300 D=1
1305 CLS:PRINT@12,"ACCOUNTS"
1310 FORI=1TO13
1315 PRINT@(3+I*32),A$(I)"   "A1$
(I)
```

```
1320 PRINT@(17+I*32),A$(I+13)"
"A1$(I+13)
1325 NEXT
1330 PRINT@480,"PRESS <A-Z> OR <
CLEAR> TO QUIT";
1335 Q$=INKEY$:IFQ$=""THEN1335
1340 IFQ$=CHR$(12)THEN1400
1345 FORI=1TO26:IFQ$=CHR$(64+I)T
HEN1350
1346 NEXT
1347 GOTO1335
1350 IFP=1THEN1380
1351 IFP1=1THEN1385
1352 IFA=1THEN1390
1353 PRINT@480,S$;
1354 PRINT@480,"ENTER ACCOUNT NA
ME  ";:LINEINPUTQ$
1360 IFQ$=""THENA1$(I)=A2$ELSE13
70
1365 GOTO1305
1370 A1$(I)=LEFT$(Q$,8):GOTO1305
1380 P=0:GOTO1184
1385 P1=0:GOTO2110
1390 A=0:GOTO445
1400 IFP=1ORP1=1THEN1410
1405 IFD=1ORA=1THEN1420
1410 P=0:P1=0:GOTO1000
1420 D=0:A=0:GOTO100
1600 CLS:N=1
1605 PRINT@106,"SORT OPTIONS"
1607 PRINT@166,"<1> SORT BY MONT
H"
1610 PRINT@198,"<2> SORT BY ACCO
UNT"
1615 PRINT@230,"<3> MAIN MENU"
1617 PRINT@294,"ENTER <1-3>";:IN
PUTQ
1620 IFQ<0ANDQ>3THEN1600
1625 ON Q GOTO1630,1720,100
1630 FOR I=1TO12
1635 GOSUB12
1640 IFD$(N,2)=""THEN100
1645 IF D(N,1)=I THEN1650ELSE165
5
1650 N=N+1:GOTO1635
1655 S=N
1660 S=S+1:IFD$(S,2)=""THEN1700
1665 IFD(S,1)<>I THEN1660
1670 Y$(1)=D$(N,1):Y$(2)=D$(N,2)
:Y(1)=D(N,1):Y(2)=D(N,2)
1675 D$(N,1)=D$(S,1):D$(N,2)=D$(
S,2):D(N,1)=D(S,1):D(N,2)=D(S,2)
1680 D$(S,1)=Y$(1):D$(S,2)=Y$(2)
:D(S,1)=Y(1):D(S,2)=Y(2)
```

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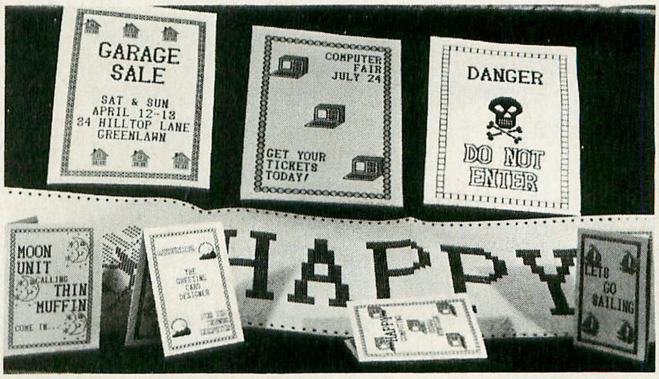

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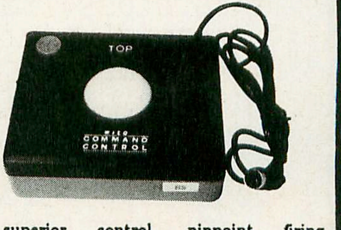

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```
1685 N=N+1:GOSUB12
1690 IF Q=2 THEN1765
1695 GOTO1660
1700 NEXT
1720 FOR I=1TO26
1725 GOSUB12
1730 IFD$(N,2)=""THEN100
1735 IFD$(N,1)=A$(I)THEN1740 ELS
E1745
1740 N=N+1:GOTO1725
1745 S=N
1750 S=S+1:IFD$(S,2)=""THEN1770
1755 IFD$(S,1)<>A$(I)THEN1750
1760 GOTO1670
1765 GOTO1750
1770 NEXT
1900 CLS:N=1
1905 PRINT@194,"INSERT DATA DISK
 NOW"
1910 PRINT@226,"PRESS <ENTER> TO
 SAVE OR"
1915 PRINT@258,"ENTER <M>ENU  ";
:LINEINPUTQ$
1920 IFQ$<>""ANDQ$<>"M"THEN1900
1925 IFQ$=""THEN1930ELSE100
1930 OPEN "O",#1,"ACCOUNT/DAT"
1935 FOR I=1TO26
1940 PRINT#1,A1$(I)
1945 NEXT
1950 IF D$(N,2)=""THEN1965
1952 IF D$(N,2)=DE$THEN1960
1955 PRINT#1,D$(N,1)
1956 PRINT#1,D$(N,2)
1957 PRINT#1,D(N,1)
1958 PRINT#1,D(N,2)
1960 N=N+1:GOTO1950
1965 CLOSE#1:GOTO100
2000 CLS:PRINT@229,"PRINTING ACC
OUNT NAMES"
2003 PRINT#-2:PRINT#-2,TAB(11);"
ACCOUNTS"
2004 PRINT#-2
2005 FOR I=1TO13
2010 PRINT#-2,TAB(3);A$(I)"="A1$
(I);TAB(17);A$(I+13)"="A1$(I+13)
2015 NEXT
2020 PRINT#-2:PRINT#-2
2025 GOTO1000
2100 N=1:Z=0
2105 P1=1:GOTO1305
2110 CLS:PRINT@227,"CALCULATING
ACCOUNT TOTALS"
2115 FORX=1TO12:MT(X)=0:NEXT
2120 IFD$(N,2)=""THEN2145
2125 IFD$(N,1)<>A$(I)THEN2140
2130 IFD$(N,2)=DE$THEN2140
2135 MT(D(N,1))=MT(D(N,1))+D(N,2
)
2140 N=N+1:GOTO2120
2145 CLS
2150 PRINT#-Z,TAB(12);A1$(I):IFZ
=2THENPRINT#-Z
2155 PRINT#-Z,TAB(8);"MONTH";TAB
(19);"TOTAL"
2160 FORX=1TO12
2165 PRINT#-Z,TAB(6);:PRINT#-Z,U
SING"#####";X;
2170 PRINT#-Z,TAB(15);:PRINT#-Z,
USING"######.##";MT(X)
2175 NEXT
2180 PRINT#-Z
2183 IFMN=1THEN2310
2185 IFZ=0THEN2195
2190 PRINT#-Z:GOTO2200
2195 PRINT@483,"<P>RINT OR <N>EX
T ACCOUNT";
2200 Q$=INKEY$:IFQ$<>"P"ANDQ$<>"
N"THEN2200
2205 IFQ$="N"THEN2100
2210 Z=2:GOTO2150
2250 CLS:PRINT@228,"CALCULATING
MONTHLY NETS"
2255 N=1:Z=0
2260 FORX=1TO12:MT(X)=0:NEXT
2265 IFD$(N,2)=""THEN2295
2270 IFD$(N,2)=DE$THEN2290
2275 I=ASC(D$(N,1))-64
2280 IFLEFT$(A1$(I),1)="-"THENMT
(D(N,1))=MT(D(N,1))-D(N,2)
2285 IFLEFT$(A1$(I),1)="+"THENMT
(D(N,1))=MT(D(N,1))+D(N,2)
2290 N=N+1:GOTO2265
2295 CLS
2297 PRINT#-Z,TAB(11);"NET INCOM
E"
2300 IFZ=2THENPRINT#-Z
2305 MN=1:GOTO2155
2310 MN=0:IFZ=0THEN2312
2311 PRINT#-Z:GOTO2313
2312 PRINT@487,"<P>RINT OR <M>EN
U";
2313 Q$=INKEY$:IFQ$<>"P"ANDQ$<>"
M"THEN2313
2315 IFQ$="M"THEN1000
2320 Z=2:GOTO2297
```

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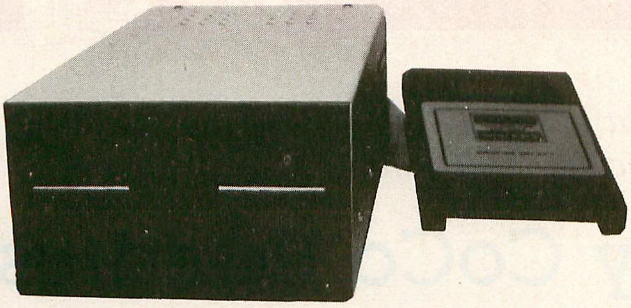

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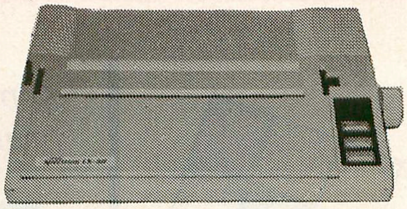

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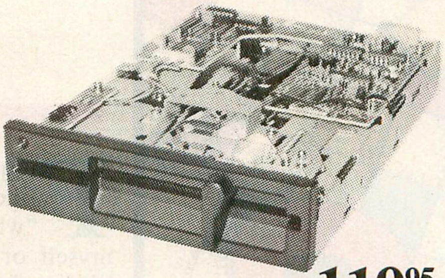

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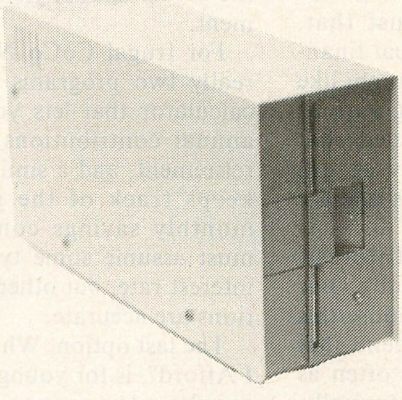

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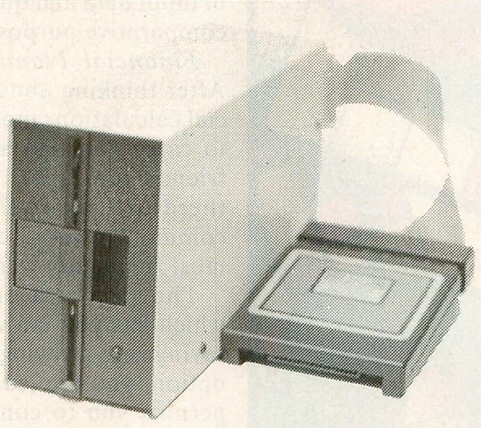

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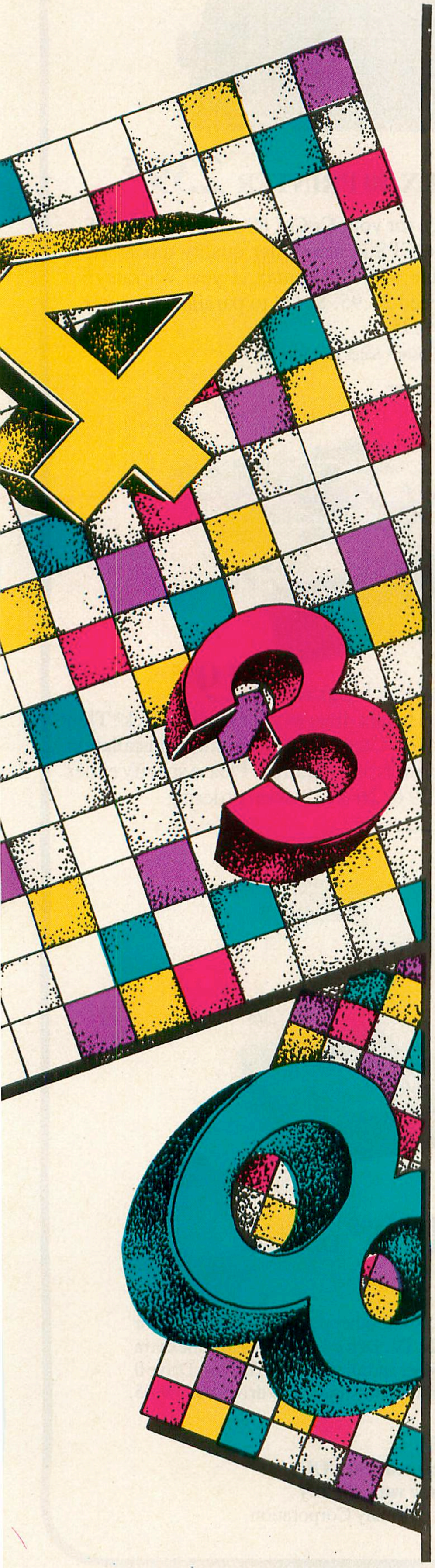


A program that lets you make practical financial projections

Thrifty CoCo Handles What-If Calculations

By Murray Zanger

Frequently throughout the year, I find I have to carry out some "what if" calculations either for myself or for others. In my program library I have several financial programs which, for example, give me a complete printout of a mortgage amortization schedule. Usually, I don't really want that extensive a result. What I would rather do is try out several sets of input data and quickly get a result for comparative purposes.

Financial Planner does just that. After thinking about the typical financial calculations most people might like to carry out, and after asking various friends for input, I determined that there are six (well, actually seven) common "what if" calculations that are most frequently wanted.

The first is Compound Interest, which lets you know how rapidly your savings are growing. If you choose this option, you are led to a submenu that permits you to compound as often as daily, or as infrequently as annually. You can quickly and easily check how much more you will get if your money is compounded more frequently. (Not as much as you might think.)

A popular option is number 2, Mortgage/Loan Payments. Before you go seek that mortgage or loan, check out what your monthly payments will be first. Also, the program will tell you what your sum total payments will be. Very depressing!

Option 3, Years to Reach Desired Amount, is for dreamers and planners. You have x dollars; you ultimately want to have y dollars for some project or trip. At a given interest rate, how many years will it take for your initial investment to grow to your goal?

Being a cynic (or a realist), I like Option 4, Yield Calculator. You see an ad in the paper, "Invest $1,000 with us today and receive $5,000 in just 20 years," or some similar nonsense. Is this really a good deal? Option 4 calculates the actual annual yield on your investment.

For frugal CoCo Nuts, Option 5 is really two programs in one: an IRA calculator that lets you see how your annual contributions will grow until retirement, and a similar program that keeps track of the growth of your monthly savings contributions. You must assume some typical or average interest rate, but otherwise the calculations are accurate.

The last option, What Mortgage Can I Afford?, is for young professionals or couples who want to buy a home but don't know how large a mortgage they can afford. Pick the monthly payment

---

Murray Zanger is a professor of organic chemistry at the Philadelphia College of Pharmacy and Science. He has been a CoCo owner for about four years and has found it invaluable for his work. He has developed several chemical applications that utilize the text and graphics capabilities of the CoCo.

you can afford, and this option will calculate the size of the mortgage you can get.

All of the calculations have a print option that gives you a hard copy of the results. Typical printouts are shown in Figure 1. The options are adaptable to many combinations and variations that you may find useful. For example, suppose you already have a mortgage at some high rate. What if you re-financed it several points lower? What would your new monthly payments be? How much less money would you pay over the life of the mortgage?

Or suppose you have been in an IRA for a number of years. You know what you have contributed and you know what it is worth. What average rate has your money been growing at? For this you can use Option 5 with a twist. Plug in your annual contributions and the number of years you've contributed, and then try different interest rates until you find the one that gives you the amount you actually have accrued. For the answer to these and other fascinating money questions, give *Financial Planner* a try.

The program itself is fairly simple in organization. The only difficult part was working out the actual equations needed.

Lines	Function
20-999	Menu
1000-1900	Compound Interest Calculation
2000-2570	Mortgage/Loan Calculation
3000-3560	Years to Reach Desired Amount
4000-4550	Yield Calculator
5000-5270	IRA/Savings Calculations
6000-6210	What Mortgage Can I Afford?

If anyone makes any improvements or additions to the program, I'd appreciate hearing from you. For me at least, this program is worth a million!

(You can write to Mr. Zanger at 512 Devon Road, Havertown, PA 19083. Please enclose an SASE for a response.) ☐

The listing: FNANPLAN

1020	53	4080	165
1230	94	5020	173
2000	227	5140	109
2530	199	6000	154
3500	236	END	161

```
20 CLS:PRINT"FINANCIAL PLANNER -
 M. ZANGER"
22 PRINT"          FEB. 12, 1986"
25 PRINT
30 PRINT"************  MENU  ***
*********";
35 PRINT
40 PRINT"1. compound interest"
50 PRINT"2. mortgage/loan paymen
ts"
60 PRINT"3. years to reach desir
ed amt."
70 PRINT"4. yield calculator"
75 PRINT"5. ira/savings contribu
tions"
77 PRINT"6. what mortgage can i
afford"
80 PRINT" ENTER YOUR CHOICE (1-6
)"
90 A$=INKEY$:IFA$=""THEN90 ELSE1
00
100 A=VAL(A$)
110 ON A GO SUB 1000,2000,3000,4
000,5000,6000
1000 CLS:PRINT"compound interest
 calculation"
1010 PRINTSTRING$(32,"=");
1012 INPUT"PRINCIPAL....";M
1014 INPUT"RATE.........";R
1016 INPUT"YEARS........";Y
1020 PRINT"+++++++  how compound
ed ++++++++";
1030 PRINT"1. Annually"
1040 PRINT"2. Semi-Annually"
1050 PRINT"3. Daily"
1055 PRINT"4. Monthly"
1060 PRINT"enter your choice (1-
4)"
1070 A$=INKEY$:IFA$=""THEN1070 E
LSE 1080
1080 A=VAL(A$)
1085 IF A=1THENC$="annually"ELSE
IFA=2THENC$= "semi-annually" ELS
EIFA=3THENC$="daily"ELSEIFA=4THE
NC$="monthly"
1090 ON A GOTO 1100,1110,1120,11
30
1100 T=1:P=Y:RR=R/100:GOTO1150
1110 T=2:P=Y*2:RR=R/200:GOTO1150
1120 T=360:P=Y*360:RR=R/36000:GO
TO1150
1130 T=12:P=Y*12:RR=R/1200:GOTO1
150
1150 PRINTSTRING$(32,"%");
1200 TV = M*(1+RR)^P
1210 PRINT"AFTER ";Y;" YEARS"
1220 PRINT"YOUR $";M;" DOLLARS"
1230 PRINT"INVESTED AT ";R;" PER
CENT"
1235 PRINT"(Compounded ";C$;")"
1240 PRINT"WILL BE WORTH ";
1250 PRINTUSING"$$###,###.##";TV
1260 PRINTSTRING$(32,"$");
1300 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
1310 A$=INKEY$:IFA$=""THEN 1310
ELSE 1320
1320 IF A$="N" THEN 1900 ELSE 13
```

```
30
1330 IF A$<"Y" ORA$>"Y" THEN 131
0 ELSE GOTO1500
1500 PRINT#-2,STRING$(55,"-")
1510 PRINT#-2,"AFTER ";Y;" YEARS
"
1520 PRINT#-2,"YOUR $";M;" DOLLA
RS"
1530 PRINT#-2,"INVESTED AT ";R;"
 PERCENT (COMPOUNDED ";C$;")"
1540 PRINT#-2,"WILL BE WORTH ";
1550 PRINT#-2,USING"$###,###.##"
;TV
1560 PRINT#-2,STRING$(55,"-")
1570 PRINT#-2,CHR$(10)
1900 PRINT"another calculation?"
1910 A$=INKEY$:IFA$=""THEN1910EL
SE1920
1920 IFA$="N"THEN END ELSE 1930
1930 IFA$="Y" THEN 20 ELSE IF A$
<"Y"ORA$>"Y" THEN 1900
2000 CLS:PRINT"  mortgage paymen
t calculation":PRINT
2010 INPUT"principal.....";P
2020 INPUT"rate..(%).....";R
2030 INPUT"years.........";Y:YY=
-(12*Y)
2040 R =R/1200
2050 PRINTSTRING$(32,"%");
2052 Z = 1-(1+R)^YY:X=Z/R
2060 MR = P/X
2070 PRINT"your monthly payment
is ";
2080 PRINTUSING"$$###.##";MR
2083 PRINT"total repayment";
2085 PRINTUSING"$$###,###.##";MR
*12*Y
2090 PRINTSTRING$(32,"%");
2200 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
2210 A$=INKEY$:IFA$=""THEN2210EL
SE2220
2220 IF A$="N" THEN 1900 ELSE 22
30
2230 IFA$<"Y"ORA$>"Y" THEN 2200
ELSE 2500
2500 PRINT#-2,STRING$(45,"=")
2510 PRINT#-2,"AMT. OF LOAN $";P
2520 PRINT#-2,"BORROWED AT %";R*
1200;
2530 PRINT#-2,"FOR A PERIOD OF";
Y;" YEARS"
2540 PRINT#-2,"YOUR MONTHLY PAYM
ENT WILL BE";
2550 PRINT#-2,USING"$###.##";MR
2552 PRINT#-2,"YOUR TOTAL PAYMEN
TS WILL BE";
2555 PRINT#-2,USING"$$###,###.##
```

```
";MR*12*Y
2560 PRINT#-2,STRING$(45,"=")
2570 PRINT#-2,CHR$(10):GOTO1900
3000 CLS:PRINT"years to reach ma
turity calcn."
3010 PRINTSTRING$(32,"#");
3020 INPUT"initial investment...
.";IV
3030 INPUT"final value..........
.";FV
3040 INPUT"interest rate........
.";R:R=R/100
3050 PRINTSTRING$(32,"%");
3060 Y=(2.303*LOG(FV/IV))/(2.303
*LOG(1+R))
3070 PRINT"years to reach final
value";
3080 PRINTUSING"###.##";Y
3300 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
3310 A$=INKEY$:IF A$=""THEN3310
ELSE 3320
3320 IF A$="N"THEN1900 ELSE 3330
3330 IFA$>"Y"ORA$<"Y"THEN 3300 E
LSE 3500
3500 PRINT#-2,STRING$(32,"="):PR
INT#-2,"IF YOU INVEST $";IV
3510 PRINT#-2,"AT A RATE OF ";R*
100;" PERCENT"
3520 PRINT#-2,"AND WANT TO RECEI
VE ";
3530 PRINT#-2,USING"$###,##.##";
FV
3540 PRINT#-2,"IT WILL TAKE ";
3545 PRINT#-2,USING"###.##";Y;:P
RINT#-2," YEARS"
3550 PRINT#-2,STRING$(32,"=")
3560 PRINT#-2,CHR$(10):GOTO1900
4000 CLS:PRINT"       yield cal
culation"
4005 PRINTSTRING$(32,"*");
4010 INPUT"initial investment..$
";IV
4020 INPUT"value at maturity...$
";FV
4030 INPUT"years to maturity....
";Y
4040 PRINTSTRING$(32,"%");
4050 R=(FV/IV)^(1/Y)-1:R=R*100
4070 PRINT"your rate of interest
 is";
4080 PRINTUSING"##.##";R;:PRINT"
%"
4300 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
4310 A$=INKEY$:IFA$=""THEN4310EL
SE4320
4320 IFA$="N"THEN1900ELSE4330
```

```
4330 IFA$<"Y"ORA$>"Y"THEN4300ELS
E4500
4500 PRINT#-2,STRING$(41,"=")
4510 PRINT#-2,"IF YOU INVEST $";
IV
4520 PRINT#-2,"FOR A PERIOD OF "
;Y;" YEARS"
4530 PRINT#-2,"AND AT MATURITY W
ILL GET $";FV
4540 PRINT#-2,"YOUR RATE OF RETU
RN WILL BE ";
4545 PRINT#-2,USING"##.##";R;:PR
INT#-2," PERCENT"
4550 PRINT#-2,STRING$(41,"="):PR
INT#-2,CHR$(10):GOTO1900
4600 PRINT#-2,CHR$(10)
5000 CLEAR1000:CLS:PRINT"ira/sav
ings contributions"
5002 PRINT:PRINT:PRINTSTRING$(32
,"*")
5004 PRINT"IRA or MONTHLY SAVING
S (I/M)"
5006 Q$=INKEY$:IFQ$=""THEN5006
5008 IFQ$="M"THEN5022
5010 INPUT"annual contribution";
P
5020 INPUT"annual interest rate"
;I:GOTO5030
5022 INPUT"monthly contribution"
;P
5024 INPUT"interest rate";I:I=I/
12
5030 R = 1+I/100
5040 INPUT"number of years";Y
5045 T=Y:IF Q$="M"THEN T=Y*12
5060 SUM=0
5070 FOR N = 1 TO T
5080 SI= P*R^N
5090 SUM = SUM+SI
5100 NEXT:CLS:PRINT:PRINT:PRINT
5105 PRINTSTRING$(32,"*");
5107 IFQ$="M"THEN5115
5110 PRINT"WITH AN ANNUAL contri
bution OF  $";P;"@ AN  interest
rate OF  ";"  %";I;" -----AFTER-
---- ";Y;"years";:GOTO5120
5115 PRINT"WITH A MONTHLY contri
bution OF  $";P;"@ AN   intere
st rate OF   ";"  %";I*12;" ---
 AFTER";Y;"years"
5120 PRINT"   YOUR total value W
ILL BE":
5130 PRINT"      ";
5140 PRINTUSING"$$###,###.##";SU
M
5150 PRINTSTRING$(32,"*");
5160 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
5170 A$=INKEY$:IFA$=""THEN5170EL
SE5180
5180 IFA$="N"THEN1900ELSE5190
5190 IFA$<"Y"ORA$>"Y"THEN5160ELS
E5200
5200 PRINT#-2,STRING$(50,"$")
5202 IF Q$="M"THEN 5232
5210 PRINT#-2,"With an annual in
vestment of $";P
5220 PRINT#-2,"At a rate of ";I;
" PERCENT"
5230 PRINT#-2,"For a total of ";
Y;" Years":GOTO5240
5232 PRINT#-2,"With a monthly in
vestment of $";P
5234 PRINT#-2,"At a rate of ";I*
12;" PERCENT"
5236 PRINT#-2,"For a total of ";
Y;" Years"
5240 PRINT#-2,"You will have a g
rand total of  ";
5250 PRINT#-2,USING"$$###,###.##
";SUM
5260 PRINT#-2,STRING$(50,"$")
5265 PRINT#-2,CHR$(10)
5270 GOTO1900
6000 CLS: PRINT"WHAT MORTGAGE CA
N YOU AFFORD?":PRINT
6005 PRINTSTRING$(32,"$");
6010 INPUT"monthly payment";MR
6020 INPUT"rate...%.......";R
6030 INPUT"years.........";Y:YY
=12*Y:R=R/1200
6050 Z=1-(1+R)^-YY:X=Z/R
6060 P=MR*X
6070 PRINT"maximum mortgage is";
6080 PRINTUSING"$$###,###.##";P
6090 PRINTSTRING$(32,"$");
6100 PRINT"DO YOU WANT A HARD CO
PY (Y/N)"
6110 A$=INKEY$:IFA$=""THEN6110
6120 IFA$="N"THEN1900ELSE6130
6130 PRINT#-2,STRING$(50,"=")
6135 PRINT#-2,"IF MAXIMUM MONTHL
Y PAYMENT CAN BE ";
6150 PRINT#-2,USING"$$##,###.##"
;MR
6160 PRINT#-2,"@ A RATE OF......
..................... %";R*1200
6170 PRINT#-2,"FOR......... ";Y;
" ........YEARS"
6180 PRINT#-2,"YOUR MORTGAGE CAN
 BE ............. ";
6190 PRINT#-2,USING"$$###,###.##
";P
6200 PRINT#-2,STRING$(50,"=");
6210 PRINT#-2,CHR$(10):GOTO1900
```

TONGUE IN CHEEK

An exciting sound-generating peripheral for the computer room

The 8088 Sounds Off

By Tobin Schuster

Casting around to discover an application [quite possibly the best] for the 8088 microprocessor, I hit upon a unique system that I hope will be of interest to hackers everywhere. I have devised a solar-powered, microprocessor-controlled wind chime. I call this system the SPMCWC. It is a suitable sound-generating peripheral for any computer room, or can be used as a high-tech designer element wherever needed.

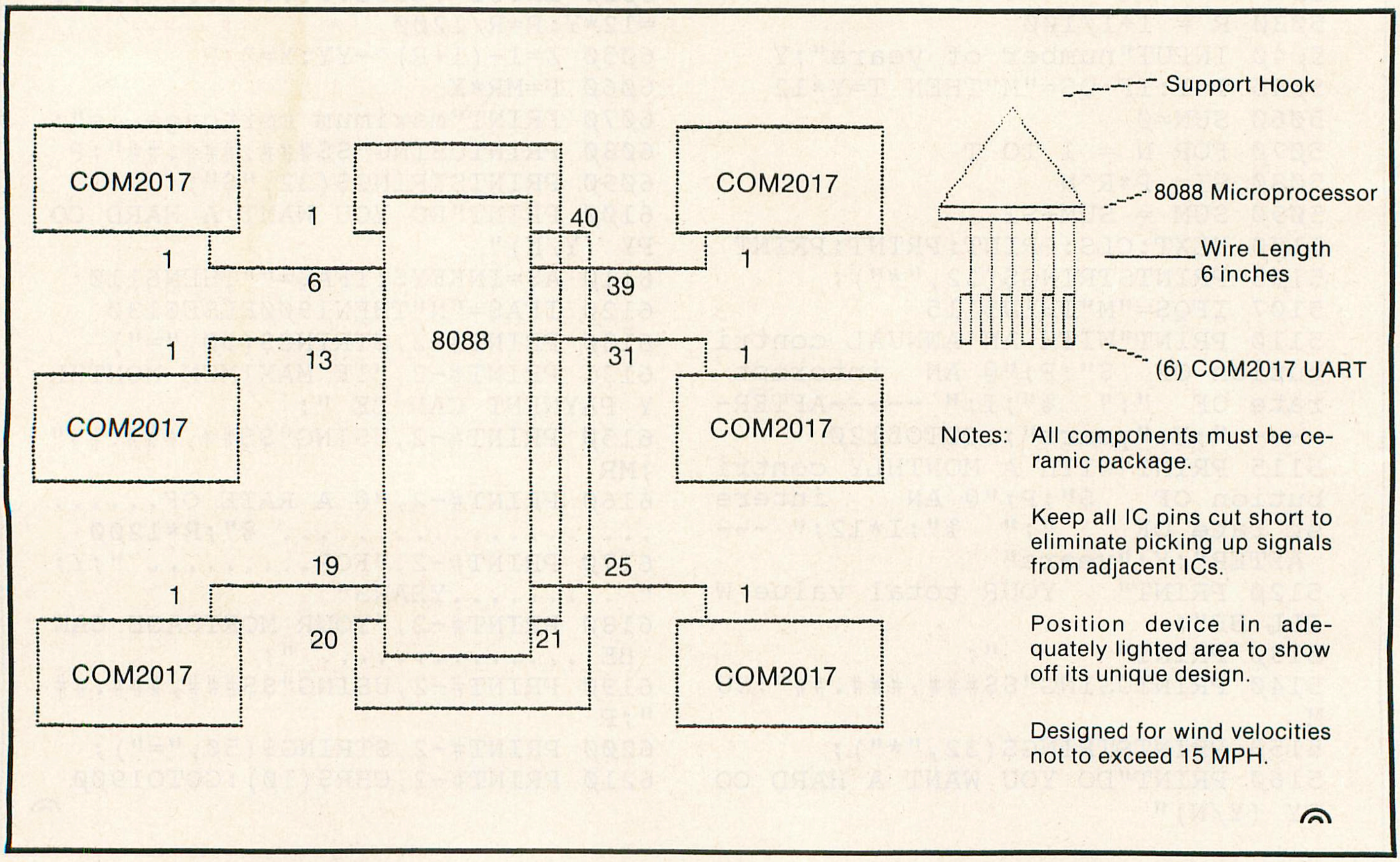
As shown by the schematic, the ceramic 8088 is well-suited for the intended environment, and provides adequate support for the rest of the circuit. The circuit consists of the supporting 8088 microprocessor and six COM2017 UARTs (universal asynchronous receiver transmitter).

The operation of the SPMCWC is very simple. The operator (you) must hang the system on a suitable hook. The SPMCWC is automatically activated when the operator releases it. Easy enough!

A Little Theory

The theory behind the SPMCWC is also quite simple. The sun warms the Earth's surface; the heat rising from the surface causes air currents. The UARTs are struck by these air currents and begin to move around. As they move, they bump into other UARTs. This bumping action causes the UARTs to begin vibrating. This vibration, transmitted into the air, is perceived by us as sound.

I hope you find the SPMCWC system as educational and entertaining as I have! ☐


COM2017
COM2017
COM2017
COM2017
COM2017
COM2017
8088
1
1
40
6
39
1
1
13
31
1
1
19
25
1
1
20
21
Support Hook
8088 Microprocessor
Wire Length 6 inches
(6) COM2017 UART
Notes: All components must be ceramic package.
Keep all IC pins cut short to eliminate picking up signals from adjacent ICs.
Position device in adequately lighted area to show off its unique design.
Designed for wind velocities not to exceed 15 MPH.

$35 Free Extras

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$119.95

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- 512K Fast High Quality Memory.
- Super Easy Solderless Installation. Installs in minutes.
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- Ideal for OS9 Level II
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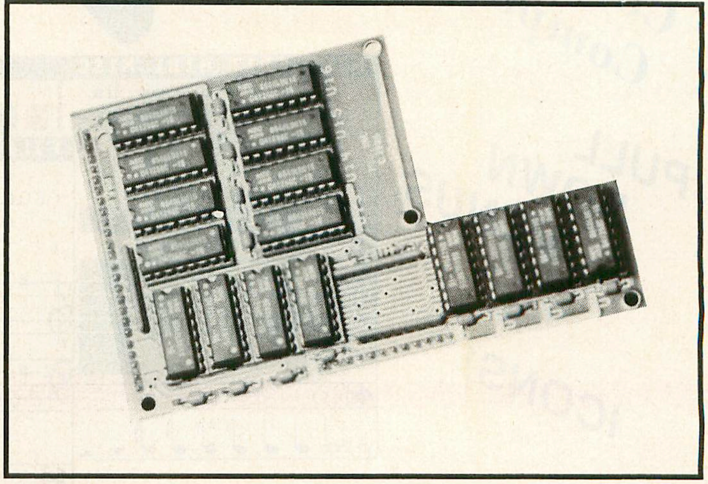
- Free GIME Chip Technical Specs ($10.00 without Turbo Ram).
- Free 512K Ram Test Program ($10.00 without Turbo Ram).
- Free MUSICA RAM Disk ($10.00 without Turbo Ram).
- $5 OFF TURBO RAM Disk.
- Also available, TURBO RAM less memory chips. **$69.95**



INSTALLATION

If you know how to hold a screwdriver, we're convinced you can install Turbo Ram in minutes. However, if you like, send us your COCO 3 insured, postage paid, and we will install it, pay the return postage and guarantee it for 1 year. **$15.00**

SATISFACTION GUARANTEED

If for any reason you wish to return Turbo Ram, you may do so within 15 days and be charged only a 10% restocking charge. You may keep the GIME CHIP Technical Specs, 512K Ram Test program and MUSICA RAM DISK, a $30 value.

TURBO RAM DISK

TURBO RAM DISK adds 2 lightning fast Ram Disks to your COCO system. Imagine saving and loading programs instantaneously and having hundreds of your programs "on line" for fast access. Single disk system users can use TURBO RAM DISK to easily make backups without continuously switching disks.

Requires 512K Turbo Charged COCO 3 . . . . **$24.95**
When purchased with TURBO RAM **$19.95**

COCO 3 128K

COLOR CONNECTION IV

This is the most comprehensive modem package for the COCO 3. All standard protocols are supported including CompuServe's Protocol B, XMODEM protocol, and XON/XOFF. Full support of the auto answer/auto dial feature for both Hayes compatible and some Radio Shack modems is provided. Single key macros allow easy entry of often-used passwords and ID's with a single key stroke.

Disk **$49.95**

COLOR SCRIBE II

This great Word Processor can take full advantage of the 80 column display of the COCO 3. Justification, Headers, Footers, and Pagination make it perfect for letters and documents as well as programming in BASIC, PASCAL, "C," and Assembly Language. Over 20 line editing commands include capabilities like character insert and delete, skip over words, breaking a line, and more!

Disk **$49.95**

THE MAGIC OF ZANTH

In the Land of Zanth, magic is commonplace. Dragons, Griffins, Centaurs and Demons abound. You are sent on a quest to discover the source of magic in the Land of Zanth. This intriguing adventure features over 2 dozen hi-res 16 color animated graphic screens, 4 voice music and sound effects. The 16 color, 320 x 192 graphics look great.

Disk **$34.95**

RETURN OF JUNIOR'S REVENGE

This is the same Junior you've seen in the Kong arcade series, but with new COCO 3 graphics. This tireless little monkey must overcome all sorts of obstacles (4 screens worth) to rescue his father, The King, from the mean zookeeper. He will traverse the jungle and swamp, climb vines, avoid chompers and birds, open locks, and more before he finally meets with his big daddy. The 16 color, 320 x 192 graphics are superb.

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The Musical Coco Max™

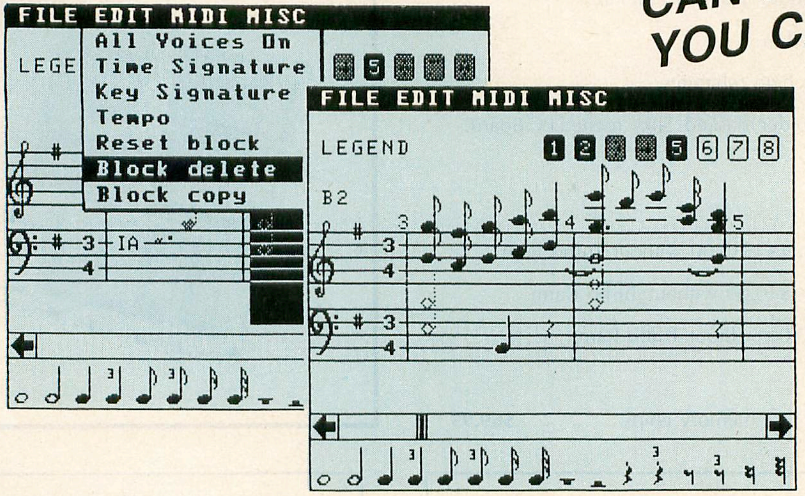
CoCo 3 Compatible

IF YOU CAN POINT, YOU CAN COMPOSE

PULL DOWN MENUS

ICONS!

A MUST FOR MIDI USERS



LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- ✓ Ultra Easy to use, just point with joystick or mouse and click.
- ✓ Compose with up to 8 completely independent voices.
- ✓ Room for over 18,000 notes. (This is not a misprint!)
- ✓ Super Simple Editing Supports:
  - Note insert
  - Note delete
  - Note change
  - Block insert
  - Block delete
  - Block copy
- ✓ Output music to:
  - TV Speaker
  - STEREO PAK
  - SYMPHONY 12
  - MIDI Synth
  - Monitor Speaker
  - ORCHESTRA 90
  - COCO MIDI S/E
  - MIDI Drum Machine
- ✓ Output up to 4 voices without additional hardware.
- ✓ Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- ✓ Output any voice on any of the 8 MIDI channels.
- ✓ Transpose music to any key.
- ✓ Modify music to any tempo.
- ✓ Automatically inserts bar for each measure as you compose.
- ✓ Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- ✓ Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- ✓ Each voice may be visually highlighted or erased.
- ✓ Each measure is numbered for easy reading.
- ✓ Solo capability
- ✓ Block edits are highlighted.
- ✓ Tie notes together for musical continuity.
- ✓ Name of note pointed to is constantly displayed.
- ✓ Jump to any point in the score instantaneously.
- ✓ Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- ✓ Help menu makes manual virtually unnecessary.
- ✓ LYRA is 100% software, no need for extra hardware unless you want more power.
- ✓ Music easily saved to tape or disk.
- ✓ Requires 64K and mouse or joystick.

LYRA (Disk only) #LY122 . . . . **$54.95**

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT

A program to convert MUSICA 2 files to LYRA files.
(T or D) #LC164 . . . . **$14.95**

LYRA STEREO ENHANCER

Gives the LYRA stereo output when used with the STEREO PAK or ORCHESTRA 90.
(T or D) #LS149 . . . . **$14.95**

LYRA MIDI CABLE

A cable to connect your computer to your MIDI synthesizer.
#MC158 . . . . **$19.95**

LYRA SYMPHONY 12 ENHANCER

Lets LYRA play all 8 voices through SYMPHONY 12.
(T or D) #LS177 . . . . **$19.95**

STEREO PAK

Plugs into the COCO ROM cartridge slot allowing easy connection to your stereo system.
#SP193 . . . . **$39.95**

SYMPHONY 12

A real hardware music synthesizer, lets LYRA play all 8 voices in stereo.
(T or D) #SY149 . . . . **$69.95**

COCO MID Seq/Editor

A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 . . . . **$149.95**

MUSIC LIBRARY

A collection of over 800 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
(T or D) #MLXXX **$29.95**

COCO MAX is a trademark of Colorware.
ORCHESTRA 90 is a trademark of Radio Shack.

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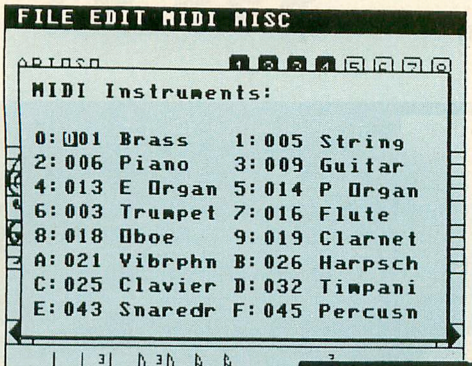


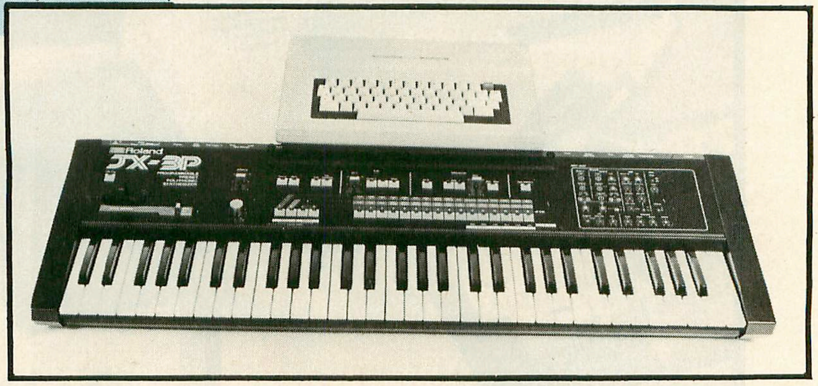
```
MIDI Instruments:

0:001 Brass      1:005 String
2:006 Piano      3:009 Guitar
4:013 E Organ    5:014 P Organ
6:003 Trumpet    7:016 Flute
8:018 Oboe       9:019 Clarnet
A:021 Vibrphn    B:026 Harpsch
C:025 Clavier    D:032 Timpani
E:043 Snaredr    F:045 Percusn
```

Introducing

CoCo 3 Compatible

COCO MIDI 2



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MORE POWER!

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI 2 system.

- Supports 16 Track recording and playback.
- Adjustable tempo.
- Over 45 Kbytes available (Over 15,500 MIDI events possible).
- Record to any track.
- Low Level track editing.
- LYRA editing. (one voice per track).
- Playback from any number of tracks.
- Quantizing to 1/16, 1/32, 1/64 intervals.
- Filter out MIDI data:
  - Key pressure
  - Program change
  - Pitch wheel
  - Control Change
  - Channel Pressure
  - System Message
- Graphic Piano Keyboard Display in both record and playback mode.
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- Syncs to drum machine as MASTER or SLAVE.
- Sequencer features.
- 100% machine code.
- "Musician Friendly" Menu Driven.
- Metronome
- Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

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TRIPLE Y-CABLE #TY173 . . . . **$34.95**

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Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds. Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.

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CASIO LIBRARIAN (Disk only) #CL169 . . . . **$39.95**

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MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.

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If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.

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Audio
Recognition
System

$99.95

Now Your Computer Can Listen To You!

CoCo 3 Compatible

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- **HANDS OFF PROGRAMMING**
- **HIGH QUALITY SPEECH REPRODUCTION**

EARS Does It All!

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Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

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Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately) or the Radio Shack Plug 'N' Power controller. For example, you can control your TV by saying "TV ON" or "TV OFF". . **$24.95**

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WITH EARS PURCHASE

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Vocal Tract Filter Settings	255	1	1	1
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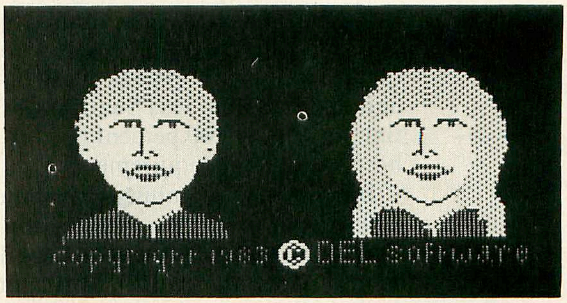

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A look at one reader's personalized system

Look What They've Done to My CoCos

By Harold L. Wolff

Our first printer was a dot-matrix Radio Shack DMP-100 and it has served us very well. But we had a problem with it (created by me) which resulted in its being out of service for two weeks. Since my wife, Sandi, uses our computer system every day, sometimes for as much as four to six hours at a time, this two-week down time was unacceptable.

This incident led to the development of the system we now have. It is this system that I will attempt to describe in my article.

We own three CoCo 2s, and I recently purchased a Smith Corona L-1000 daisy wheel printer. We have retired the DMP-100 to backup status. The L-1000 is a marvelous printer at a good price. It has 16 Baud rates and parallel input.

As you may have guessed, a major factor in the development of my "cheap and dirty" system was Sandi's substantial use of it. A 100 percent backup had become a major requirement.

Back in the beginning, I installed a 400-watt inverter to power only the CoCos in order to prevent data loss. The CoCo only consumes about 24 watts, so a 60-watt inverter would have done. I "overbought" because of the occasional hurricane in our area.

The inverter has a square wave output rather than a sine wave. A square wave inverter is relatively cheap and easy to make. The 120 VAC feeds the power transformer which feeds the bridge rectifier. The CoCo works on +5 VDC and –5 VDC regulated, so the square wave ultimately has no noticeable effect on the CoCo. The inverter is powered by a 12 VDC car battery which is on continuous float charge.

Since then, I have developed a battery backup for the CoCo for the cost of six D cells and two diodes.

I spent a long time searching for a CoCo diagram with no success. Finally, I tried Radio Shack. Within a week I had a complete service manual. Radio Shack to the rescue.

Our CoCos are almost exclusively used for word processing with the *Color Scripsit* program packs, and the computers are never turned off. In our part of town we average a power dip once every four weeks, so the battery backup system is a necessity, not a luxury.

There are several ways to accomplish battery backup. I used a minimum number of parts to do it the cheapest and most reliable way. Since the +DC output of the bridge is about +9.50 VDC to ground, I chose to tie in the 9 VDC battery backup output isolated with diodes (see Figure 1). No current will flow from the battery pack into the CoCo unless the magnitude of the

---

Harold Wolff is an electrical engineer employed by a pipeline firm in Houston, Texas. His wife, Sandi, is a licensed ordained minister. She used their CoCos for all seminary work, including preparation of her thesis.

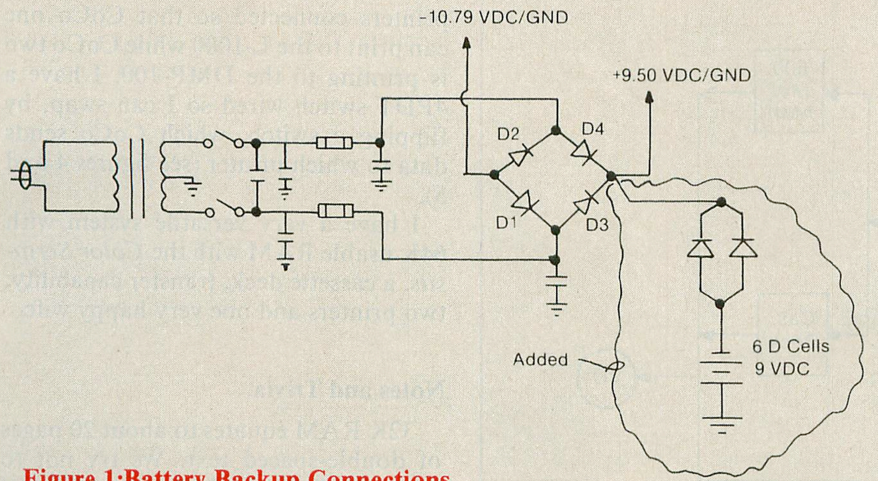


Figure 1:Battery Backup Connections

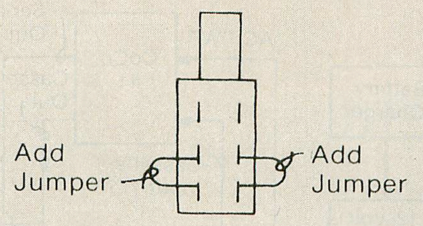


Figure 2: Off/On Switch Defeat

CoCo supply becomes less than that of the battery pack. The diodes inhibit the CoCo power supply from feeding the battery pack, which could possibly overload the power supply. I chose to use alkaline non-rechargeable cells.

I tied in the positive where the cathodes of D3 and D4 tie together. D3 and D4 are larger than D1 and D2 since they supply more current to the +5 VDC supply than D1 and D2 supply to the -5 VDC supply. The -5 VDC is only used for the RS-232C output drivers. I tied the negative to the black lead of the secondary of the power transformer.

You can verify that you are at the right diodes by checking with your voltmeter that there are about +9.5 volts from there to ground. Don't be fooled; the two fuses look almost like diodes.

I also defeated the off/on switch so it could not be left in the off position causing the battery pack to be drained (see Figure 2).

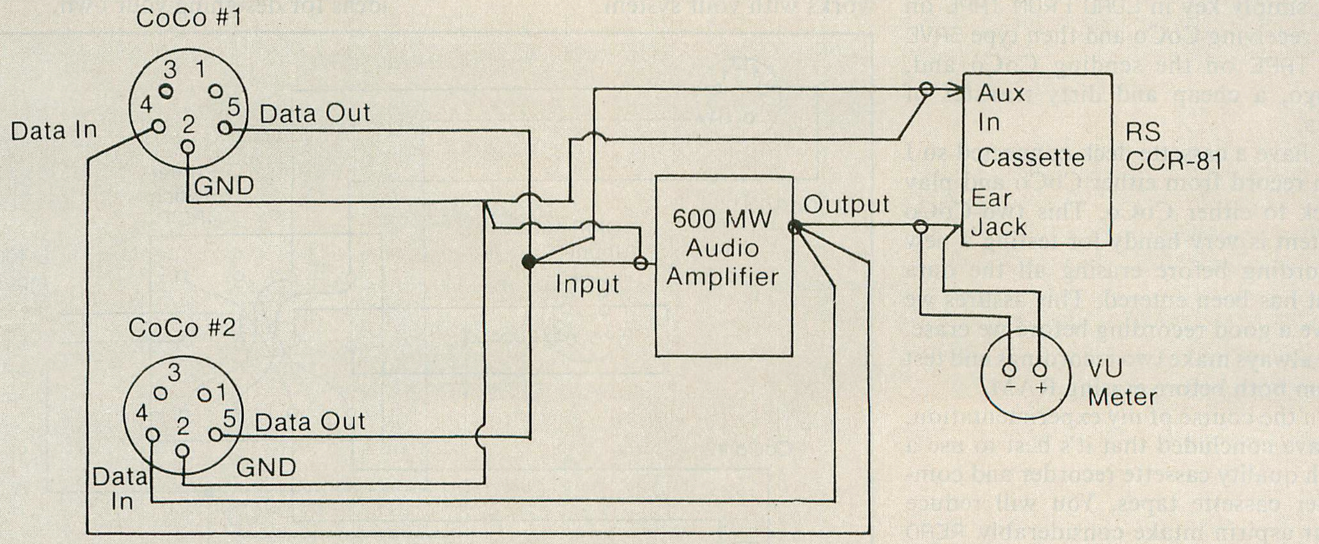
I paralled two 3-amp diodes to give me plenty of current capacity and to lower the drop across the diodes on the battery backup system. Some people call this overkill, but diodes are cheap and I'm buying some insurance for pennies.

Test the battery backup once a month and replace the batteries each year. To test the backup, have some data in memory you don't mind losing. Unplug the cord from the outlet and leave it unplugged for 10 seconds. Plug it back in. If the screen went blank or there was some data loss, replace the battery pack.

The purpose of this battery backup is to ride through power dips. An extended electrical outage would result in the battery pack being drained. A switch could be added so that the 120 VAC power and the 9 VDC battery would be turned off simultaneously.

For $9.95 each, I ordered upgrade kits for the CoCos. The kits each included eight 4164N/20 chips and an instruction sheet. There are eight plug-in chips to change and one solder-in jumper to add. This gives me 32K of RAM accessible in each CoCo now. The upgrades are not a true 64K upgrade since I did not install the plug-in ROM and did not do the necessary changes required to allow disk operation. I did a cheap and dirty upgrade which increased my RAM memory for word processing from 16K to 32K per CoCo.

Now I would like to describe how two of our CoCos are hooked together.



Note: All cables use ground shields. All shields are tied together.

Figure 3: Cassette Deck and VU Meter Connections

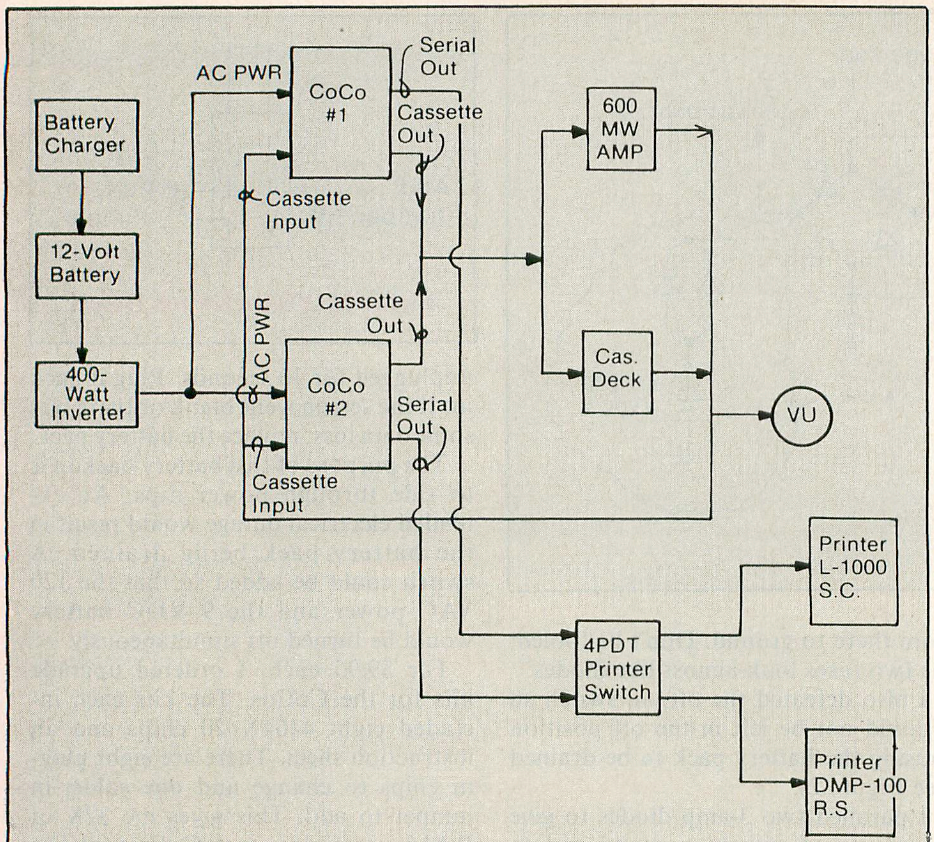


Figure 4: System One Line Configuration

I tied the cassette output of each CoCo to the cassette input of the other one. I can send data from one CoCo to the other. To accomplish this I had to use a small audio amplifier to bring the level of the CoCo output up to the required input level of the other one (see Figure 3).

I simply key in `LOAD FROM TAPE` on the receiving CoCo and then type `SAVE ON TAPE` on the sending CoCo and, bingo, a cheap and dirty transfer of data.

I have a cassette deck connected so I can record from either CoCo and play back to either CoCo. This two-CoCo system is very handy for testing a new recording before erasing all the data that has been entered. This assures we have a good recording before we erase. We always make two recordings and test them both before erasing RAM.

In the course of my experimentation, I have concluded that it's best to use a high quality cassette recorder and computer cassette tapes. You will reduce your aspirin intake considerably. `READ ERROR` becomes the norm when you use audio tapes and a cheap recorder.

I also put a VU meter on my system. The VU meter monitors the signal level of what's going into the receiving CoCo. The CoCo is somewhat sensitive to the level of its input. The VU meter is used when transferring data between CoCos and when playing a tape back into the CoCo (see figures 3 and 4).

A good level is about -4 on my VU meter. All VU meters are not created equal. You just need to try and see what works with your system.

I have both the L-1000 and DMP-100 printers connected so that CoCo one can print to the L-1000 while CoCo two is printing to the DMP-100. I have a 4PDT switch wired so I can swap, by flipping a switch, which CoCo sends data to which printer (see figures 4 and 5).

I have a very versatile system with 64K usable RAM with the *Color Scripsits*, a cassette deck, transfer capability, two printers and one very happy wife.

Notes and Trivia

32K RAM equates to about 20 pages of double-spaced text. We try not to exceed 16K blocks for our tape file. Of course, this is optional, but I feel that the longer the file, the more apt you are to have a `READ` problem.

I have also found that where you locate your cassette recorder in relation to the CoCo, TV and printer sometimes makes a difference when trying to `SAVE` and `LOAD` from tape. I located our cassette about 12 inches below all of our other equipment on a special shelf.

The amplifier must be off while the cassette deck is in use. The cassette deck must be off (not in use and not in pause) when data transfer is being used.

We do not use the automatic cassette start/stop feature of the CoCo, but I suppose you could just parallel the two isolated contacts out of each CoCo to start and stop the cassette.

I hope you've enjoyed this brief tour of our system. Maybe this will give you ideas for designing your own. ☐

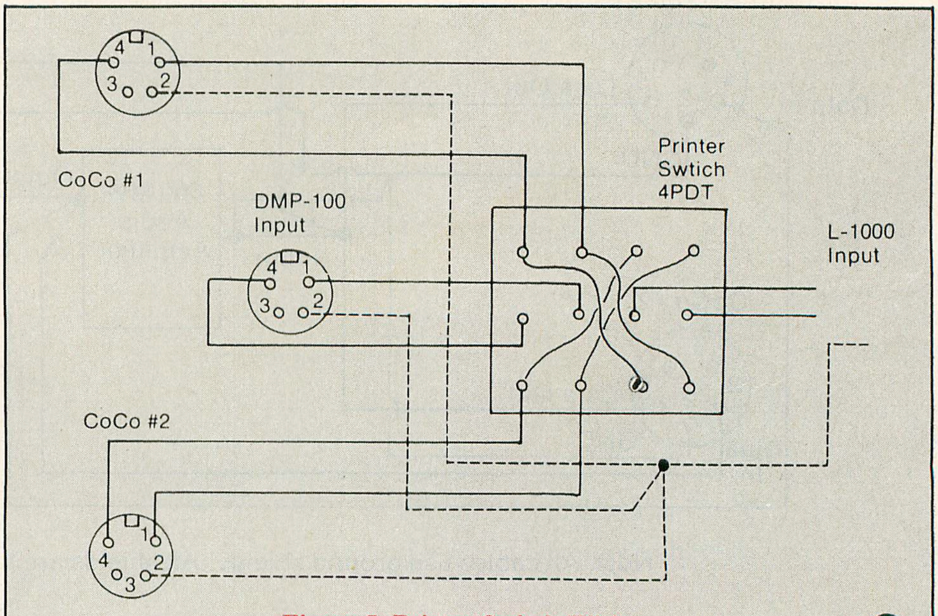


Figure 5: Printer Switch Wiring

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A MILESTONE

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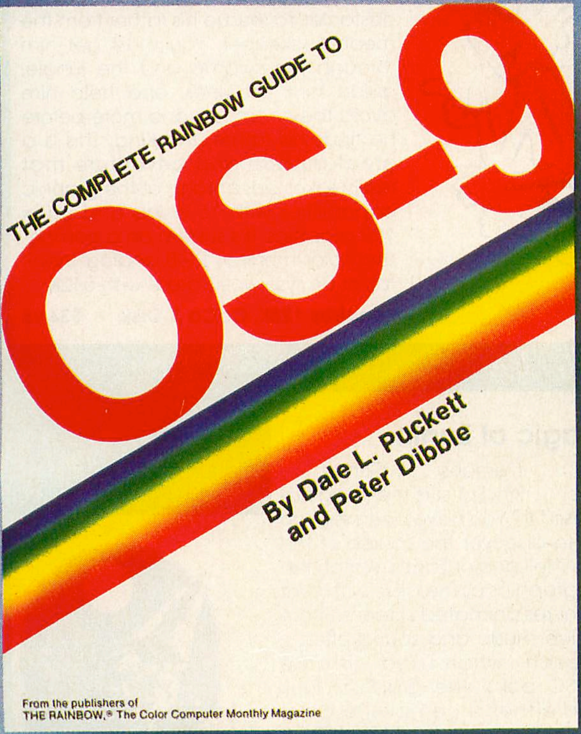
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by Steve Hartford

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This simulation is fully **mouse/joystick driven** with **pull down menus** and **windows**. It takes full advantage of the CoCo 3's graphics. If your CoCo has 512K, it will be used as a fast Ramdisk. This is an adventure in strategy and an in-depth exploration of the CoCo 3's real capabilities.

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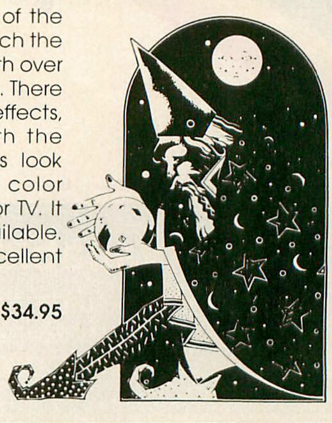

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celebrates the CoCo 3!!!

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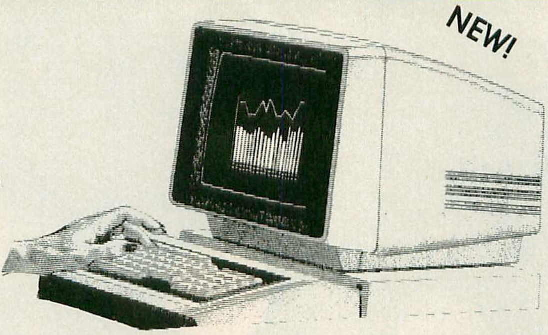
Screen Star



NEW!

by Scott Cabit

This is the screen editor everyone has been waiting for! Screen Star is clearly the most powerful editing product ever available on the Color Computer.

WordStar Implementation

What makes it so powerful? Screen Star implements the popular WordStar editing capabilities. If you know or use WordStar on any other computer, you already know how to use Screen Star on your CoCo! Plus, what you learn with Screen Star you can use on nearly any other computer you use later.

Edit Files Larger than Memory

Since Screen Star uses the disk as an extension of memory, it will edit files larger than memory. You are not confined to small text or program files!

Block Commands

With a keystroke you can mark the start and end of a block, then move, copy, or delete the block with another keystroke.

Cursor Movement

An array of powerful cursor commands help you to move left or right one character, or one word, or one line; scroll forward or back one line, one screen, one block; jump to the start or end of the line or the screen, block, or file.

Find & Find/Replace Commands

Full implementation of find and find/replace commands make mass changes and searches a snap. This is so time saving when programming or word processing!

Parameter Commands

Personalize your editing environment using the parameter commands. Set tabs, toggle the video, access the OS-9 Shell, and choose wordwrap. CoCo 3 users can define up to 10 functions keys for fast, repetitive functions.

Smart Speller Included

Smart Speller is included in the package too! This is a revolutionary new idea in spelling checker programs. Unlike most spelling checkers which require a huge dictionary file containing every word you ever wish to use, Smart Speller utilizes a relatively small dictionary which contains the most common English misspellings and their correct spellings. This makes Smart Speller much easier to use, since it will not stop at every word and requires much less space.

Smart Speller will also recognize any abbreviations you commonly use and replace them with their full spellings automatically! This feature alone can save you countless hours of typing time.

Pop-Up Help Menus

Help is as close as a keystroke. At any time you can bring up a concise list of commands and functions to help you use Screen Star's full capabilities.

Closing Commands

Not only can you exit the editor with or without save, but you can import or export files whenever you need them.

Use with Text Formatter

Screen Star works especially well with Computerware's OS-9 Text Formatter to provide a full word processing team. You simply imbed the Text Formatter commands in your Screen Star file. It will then be printed in style with headers, footers, pagination, justification, etc. We offer a special package price for this powerful duo!

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CoCo 3 users can run Screen Star with either Level 1 or Level 2 OS-9 and have the added advantage of the ALT and function keys. The Level 2 screen driver provided (and required) offers extended capabilities for scrolling and display features on an 80 x 24 screen.

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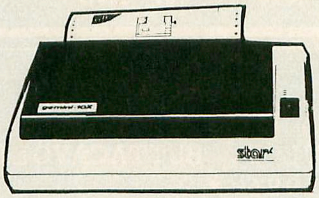

OS-9 Text Formatter

At last, an easy way to get beautiful documents and letters with OS-9! You need not buy and learn another editor. This Text Formatter interfaces with any editor that produces standard ASCII text files including Computerware's Advanced Editor, Radio Shack's TS Edit, and Computerware's new Screen Star. You simply imbed any of the dozens of print commands in your text file and let the Text Formatter print your beautifully formatted text for you.

Page and Line Directives:

Text Formatter includes commands for left and right justification, page breaks, special spacing, automatic pagination for your given number of lines per page and the width of the lines, automatic page numbering, and more.

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There are many ways to format your text with centering, indenting, tabs, and underlining. Also included is the ability to send escape and control codes to your printer to utilize its special features.

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Special Features

Other important features include macros for often used sequences and formatting, relative arguments for setting spacing directives, upper and lower case modes, nonprintable remarks, and more!

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Find the right combination to control this colorful confusion

CoCo 3 Gets You Over a Barrel

By Paul D. Buttacavoli

The *Barrel Puzzle* is a single-unit puzzle that contains a total of 23 movable colored balls. There are two rings, each holding 10 balls, and a plunger that moves 15 of the balls up and down through the rings. The balls are arranged in six colors, four each of five colors, and three gray.

While there are fewer possible combinations with this puzzle than with the Rubik's cube, this one is much more difficult to solve because of the number of moves necessary to make a simple change.

Instructions for using the program are in the listing, so just type it in and run. The colors have been chosen for an RGB monitor. The program saves to disk as listed; to save to cassette, just change all #1s to #-1s.

Enjoy yourself — and good luck; you'll need it! ☐

Paul Buttacavoli lives in Alameda, California, and works at the Claremont Country Club. He has been programming the CoCo for six years, and uses his CoCo 1 to run the "Cosmic Connection" BBS.

```
140 ......178   6010 .....187
510 ......206   20020 ....172
1010 .....228   20190 ....223
3070 ......97   END ......71
```

The listing: BARREL

```
10 '*>BARREL PUZZLE<*
    *>BY PAUL D. BUTTACAVOLI<*
    *>NOV. 1986<*
11 PALETTE RGB:ON BRK GOTO 10000
12 WIDTH 40:CLS:LOCATE11,11:ATTR
0,1,B:PRINT"*>BARREL  PUZZLE<*";
13 ATTR0,1
14 LOCATE 11,23:PRINT"WANT INSTR
UCTIONS? ";
15 X$=INKEY$:IF X$="" THEN 15 EL
SE IF X$="Y" OR X$="y" THEN GOSU
B 20000
```

```
16 CLS:LOCATE8,0:PRINT"JOYSTICK
OR KEYBOARD? ";
17 J$=INKEY$:IF J$="" THEN 17
18 IF J$<>"J" AND J$<>"K" AND J$
<>"j" AND J$<>"k" THEN 17
20 POKE&HFFD9,0
50 FOR X=0 TO 7
60 READ C
70 PALETTE X,C
80 NEXT X
90 DATA 63,0,15,32,53,55,20,7
100 HSCREEN 2
103 HCLS
105 C=2
110 FOR X=65 TO 265 STEP 50
120 FOR Y=20 TO 170 STEP 30
130 IF X=115 OR X=215 THEN IF Y=
20 OR Y=170 THEN GOTO 150
140 HCIRCLE(X,Y),12,1:HPAINT(X,Y
),C,1
150 NEXT Y
160 C=C+1
170 NEXT X
180 FOR X=65 TO 265 STEP 100
190 HPAINT(X,20),7,1
200 HPAINT(X,170),0,1
210 NEXT X
212 HPAINT(0,0),1,1
215 U=1
300 X$=INKEY$:IF X$="" THEN 300
301 ON ERR GOTO 300
303 IF X$="L" OR X$="l" GOSUB 40
000:GOTO 340
310 FOR A=0 TO 40+RND(20)
315 B=RND(6):IF B=2 AND C=1 THEN
 315 ELSE IF B=1 AND C=2 THEN 31
5 ELSE IF B=3 AND C=5 THEN 315 E
LSE IF B=5 AND C=3 THEN 315 ELSE
 IF B=4 AND C=6 THEN 315 ELSE IF
 B=6 AND C=4 THEN 315
320 C=B:ON B GOSUB 1000,2000,300
0,4000,5000,6000
330 NEXT A
340 ON ERR GOTO 340:IF J$="J" OR
 J$="j" THEN 600
500 X$=INKEY$:IF X$="" THEN 500
510 IF X$="^" THEN GOSUB  2000
520 IF X$=CHR$(10) THEN GOSUB 10
00
530 IF X$=CHR$(21) THEN GOSUB 30
00
540 IF X$=CHR$(93) THEN GOSUB 50
00
550 IF X$=CHR$(8) THEN GOSUB 400
0
560 IF X$=CHR$(9) THEN GOSUB 600
0
563 IF X$="S" OR X$="s" GOSUB 30
000
```

```
565 IF X$="L" OR X$="l" GOSUB 40
000
570 GOTO 500
600 B=JOYSTK(0):C=JOYSTK(1):D=BU
TTON(0):X$=INKEY$
610 IF B<20 AND D=0 GOSUB 4000
620 IF B>40 AND D=0 GOSUB 6000
630 IF B<20 AND D=1 GOSUB 3000
640 IF B>40 AND D=1 GOSUB 5000
650 IF C<20 GOSUB 2000
660 IF C>40 GOSUB 1000
663 IF X$="S" OR X$="s" GOSUB 30
000
665 IF X$="L" OR X$="l" GOSUB 40
000
670 GOTO 600
1000 REM *>DOWN<*
1005 IF U=0 THEN RETURN
1007 U=0
1010 FOR X=65 TO 265 STEP 100
1020 FOR Y=170 TO 20 STEP-30
1030 C=HPOINT(X,Y)
1040 HPAINT(X,Y+30),C,1
1050 NEXT Y,X
1060 FOR X=65 TO 265 STEP 100
1070 HPAINT(X,20),0,1
1080 NEXT X
1090 RETURN
2000 REM *>UP<*
2005 IF U=1 THEN RETURN
2007 U=1
2020 FOR X=65 TO 265 STEP 100
2030 FOR Y=50 TO 170 STEP 30
2040 C=HPOINT(X,Y)
2050 HPAINT(X,Y-30),C,1
2060 NEXT Y,X
2070 FOR X=65 TO 265 STEP 100
2080 HPAINT(X,170),0,1
2085 NEXT X
2090 RETURN
3000 REM *>TOP LEFT<*
3010 C1=HPOINT(65,50):C2=HPOINT(
65,70)
3020 FOR X=115 TO 265 STEP 50
3030 C3=HPOINT(X,50):C4=HPOINT(X
,80)
3070 HPAINT(X-50,50),C3,1:HPAINT
(X-50,80),C4,1
3075 NEXT X
3100 HPAINT(265,50),C1,1:HPAINT(
265,80),C2,1
3120 RETURN
4000 REM *>BOTTOM LEFT<*
4010 C1=HPOINT(65,110):C2=HPOINT
(65,140)
4020 FOR X=115 TO 265 STEP 50
4030 C3=HPOINT(X,110):C4=HPOINT(
X,140)
4070 HPAINT(X-50,110),C3,1:HPAIN
```

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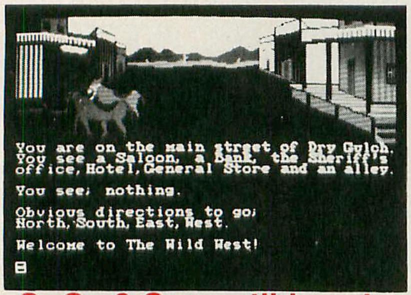

```
You are on the main street of Dry Gulch.
You see a Saloon, a Bank, the Sheriff's
office,Hotel,General Store and an alley.

You see: nothing.

Obvious directions to go:
North,South,East,West.

Welcome to The Wild West!
```

CoCo 3 Compatible only

NEW RELEASE
THE WILD WEST

Get out your six shooter and polish your spurs! Journey into the gunslinging land of the old west. As sheriff of Dry Gulch, your job is to keep the peace. But the notorious desperado Black Bart has escaped from jail and is on his way to Dry Gulch to recover his hidden fortune!

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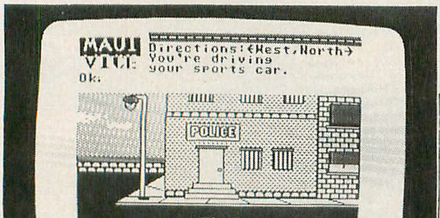

```
MAUI  Directions:<West,North>
VICE  You're driving
      your sports car.
Ok:
```

* Maui Vice

Step into the shoes of Crockett & Tubbs, and gather evidence, photographs and witnesses to convict your suspects! With "windows" to select your options, hi-res graphics, and a new story generated each time you play. This is state-of-the-art that guarantees excitement and newness every time you play.

64K Ext. Basic & Joystick Required

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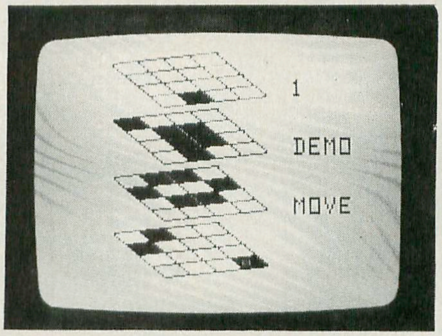

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Requires 32K 1 or 2 Players

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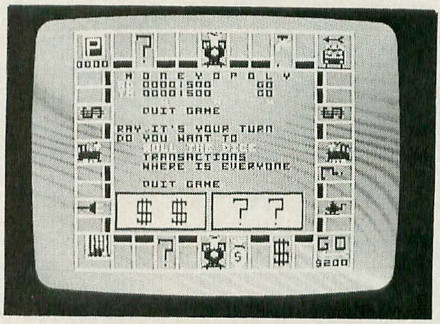


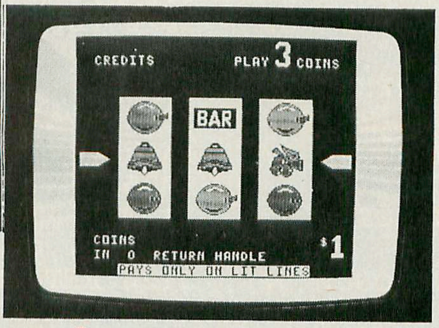
```
M O N E Y O P O L Y
  00001500      GO
  00001500      GO

  QUIT GAME

RAY IT'S YOUR TURN
DO YOU WANT TO

  TRANSACTIONS
  WHERE IS EVERYONE

  QUIT GAME
```

* Moneyopoly

Play the popular board game on one of the most realistic computer game simulations ever! Contains all the features of the original. Buy, sell, rent, wheel & deal your way to fortune.

32K Joystick Required

Tape $19.95 Disk $22.95

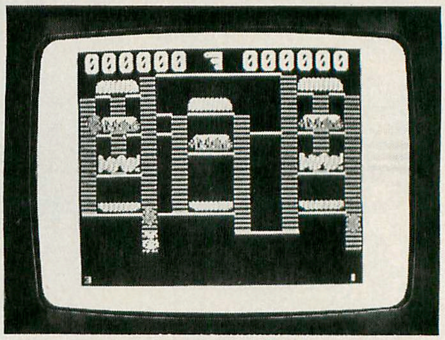


* Vegas Game Pak

Six games in all! Blackjack, Keno, Video Poker & 3 slot machine lookalikes. Super graphics!

16K Ext. Basic Required

Tape $24.95 Disk $27.95



* NEW RELEASE
LUNCHTIME

Your chef, Peter Pepper, is surrounded! Dodge pickles, hot dogs, and eggs while building hamburgers. This high res game features 7 difficult levels of wild entertainment. Fast paced action for either one or two players. Have a Burger Time. . .

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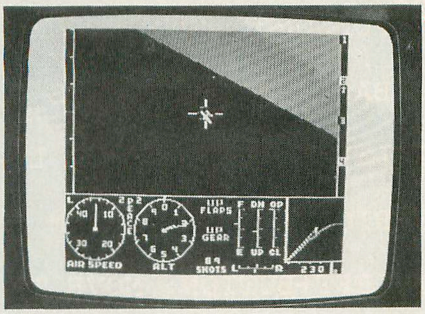

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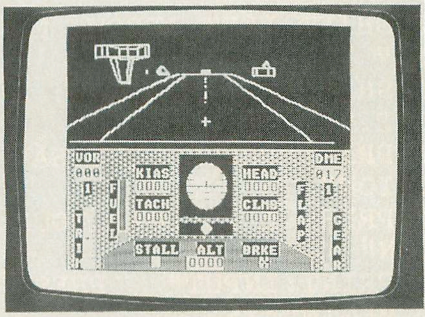
Flight Manual Included
Tape $29.95 Disk $34.95



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Real-time simulation generates panoramic 3-D views of ground features as you fly your sophisticated plane in any of nine different "worlds." Program models over 35 different aircraft/flight parameters. Realistic sound effects too! Manual included helps you through a typical short flight.

32K Machine Language
Flight Manual Included
Joysticks Required
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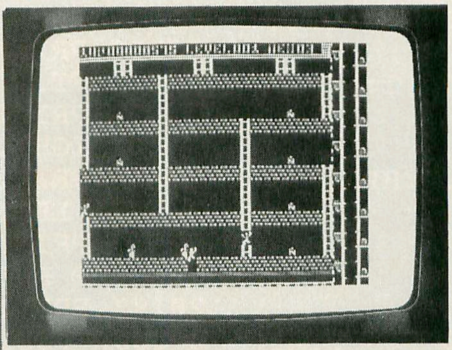

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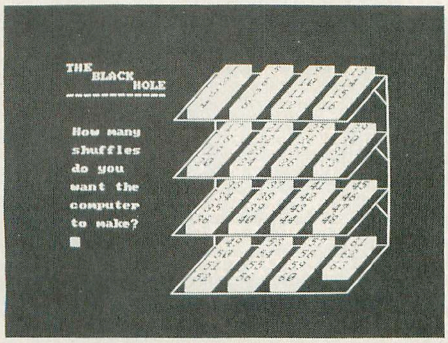

```
THE BLACK HOLE
--------------

How many
shuffles
do you
want the
computer
to make?
```

NEW RELEASE
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For anyone who enjoys solving a challenging logical puzzle, here is a 3-dimensional puzzle composed of 63 numbered cubes in a 4 by 4 by 4 array that leaves one BLACK HOLE. You tell the computer to sort the cubes and the computer tells you to put them in numerical order. A real brain bender. Outstanding color and action. Years of entertainment. . .

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```
T(X-50,140),C4,1
4075 NEXT X
4100 HPAINT(265,110),C1,1:HPAINT
(265,140),C2,1
4120 RETURN
5000 REM *>TOP RIGHT<*
5010 C1=HPOINT(265,50):C2=HPOINT
(265,80)
5020 FOR X=215 TO 65 STEP-50
5030 C3=HPOINT(X,50):C4=HPOINT(X
,80)
5060 HPAINT(X+50,50),C3,1:HPAINT
(X+50,80),C4,1
5070 NEXT X
5100 HPAINT(65,50),C1,1:HPAINT(6
5,80),C2,1
5110 RETURN
6000 REM *>BOTTOM RIGHT<*
6010 C1=HPOINT(265,110):C2=HPOIN
T(265,140)
6020 FOR X=215 TO 65 STEP-50
6030 C3=HPOINT(X,110):C4=HPOINT(
X,140)
6060 HPAINT(X+50,110),C3,1:HPAIN
T(X+50,140),C4,1
6070 NEXT X
6100 HPAINT(65,110),C1,1:HPAINT(
65,140),C2,1
6110 RETURN
10000 POKE&HFFD8,0
10010 PALETTE RGB
10020 CLS:PRINT" THANKS FOR PLAY
ING!":
10030 PRINT:PRINT:PRINT:PRINT:EN
D
20000 REM *>INSTRUCTIONS<*
20010 CLS:PRINT"   THE PUZZLE CO
NSISTS OF COLUMNS OF    COLORED
BALLS. THERE ARE 4 BALLS OF 5
COLORS, AND 3 GRAY BALLS. THE OB
JECT IS TO ARRANGE THE COLORED B
ALLS IN COLUMNS.THE GRAY BALLS G
O AT THE TOP OF THE      LEFT, RI
GHT AND CENTER COLUMNS."
20020 PRINT:PRINT"   WHEN YOU FI
RST SEE THE PUZZLE, IT     WILL B
E IN ONE OF A NUMBER OF POSSIBLE
  SOLVED POSITIONS. PRESSING ANY
 KEY      EXCEPT BREAK WILL THEN
 RANDOMLY SCRAMBLETHE BALLS."
20030 PRINT:PRINT"   WHEN MOVING
 BALLS, THEY MOVE UP AND  DOWN I
N GROUPS OF 15, OR LEFT AND RIGH
T IN GROUPS OF 10. WHEN MOVING U
P OR DOWN,YOU MOVE THE LEFT, RIG
HT AND CENTER     COLUMNS. WHEN
MOVING LEFT OR RIGHT, YOU MOVE T
HE 2 TOP ROWS, OR THE 2 BOTTOM"
20040 PRINT"ROWS."
```

```
20050 PRINT:INPUT"   PRESS <ENTE
R> TO CONTINUE";X$
20060 CLS:PRINT"   JOYSTICK MOVE
MENT:":PRINT
20070 PRINT"FORWORD: MOVE COLUMN
S UP."
20080 PRINT"BACK: MOVE COLUMNS D
OWN."
20090 PRINT"LEFT: MOVE BOTTOM LE
FT."
20100 PRINT"RIGHT: MOVE BOTTOM R
IGHT."
20110 PRINT"LEFT+BUTTON: MOVE TO
P LEFT."
20120 PRINT"RIGHT+BUTTON: MOVE T
OP RIGHT."
20130 PRINT:PRINT"   KEYBOARD MO
VEMENT:":PRINT
20140 PRINT"UP ARROW: MOVE COLUM
NS UP."
20150 PRINT"DOWN ARROW: MOVE COL
UMNS DOWN."
20160 PRINT"LEFT ARROW: MOVE BOT
TOM LEFT."
20170 PRINT"RIGHT ARROW: MOVE BO
TTOM RIGHT."
20180 PRINT"SHIFT LEFT ARROW: MO
VE TOP LEFT."
20190 PRINT"SHIFT RIGHT ARROW: M
OVE TOP RIGHT."
20193 PRINT:PRINT"PRESS S TO SAV
E YOUR POSITION"
20195 PRINT"PRESS L TO LOAD YOUR
 OLD POSITION"
20200 PRINT:PRINT:INPUT"   PRESS
 <ENTER> TO BEGIN";X$
20210 RETURN
30000 REM *>SAVE<*
30010 OPEN"O",#1,"PUZZLE.DAT"
30020 PRINT#1,U
30030 FOR X=65 TO 265 STEP 50
30040 FOR Y=20 TO 170 STEP 30
30050 IF X=115 OR X=215 THEN IF
Y=20 OR Y=170 THEN 30070
30060 F=HPOINT(X,Y):PRINT#1,F
30070 NEXT Y,X
30080 CLOSE #1
30090 RETURN
40000 REM *>LOAD<*
40020 OPEN"I",#1,"PUZZLE.DAT"
40030 INPUT #1,U
40040 FOR X=65 TO 265 STEP 50
40050 FOR Y=20 TO 170 STEP 30
40060 IF X=115 OR X=215 THEN IF
Y=20 OR Y=170 THEN 40080
40070 INPUT #1,C:HPAINT(X,Y),C,1
40080 NEXT Y,X
40090 CLOSE #1
40100 RETURN
```

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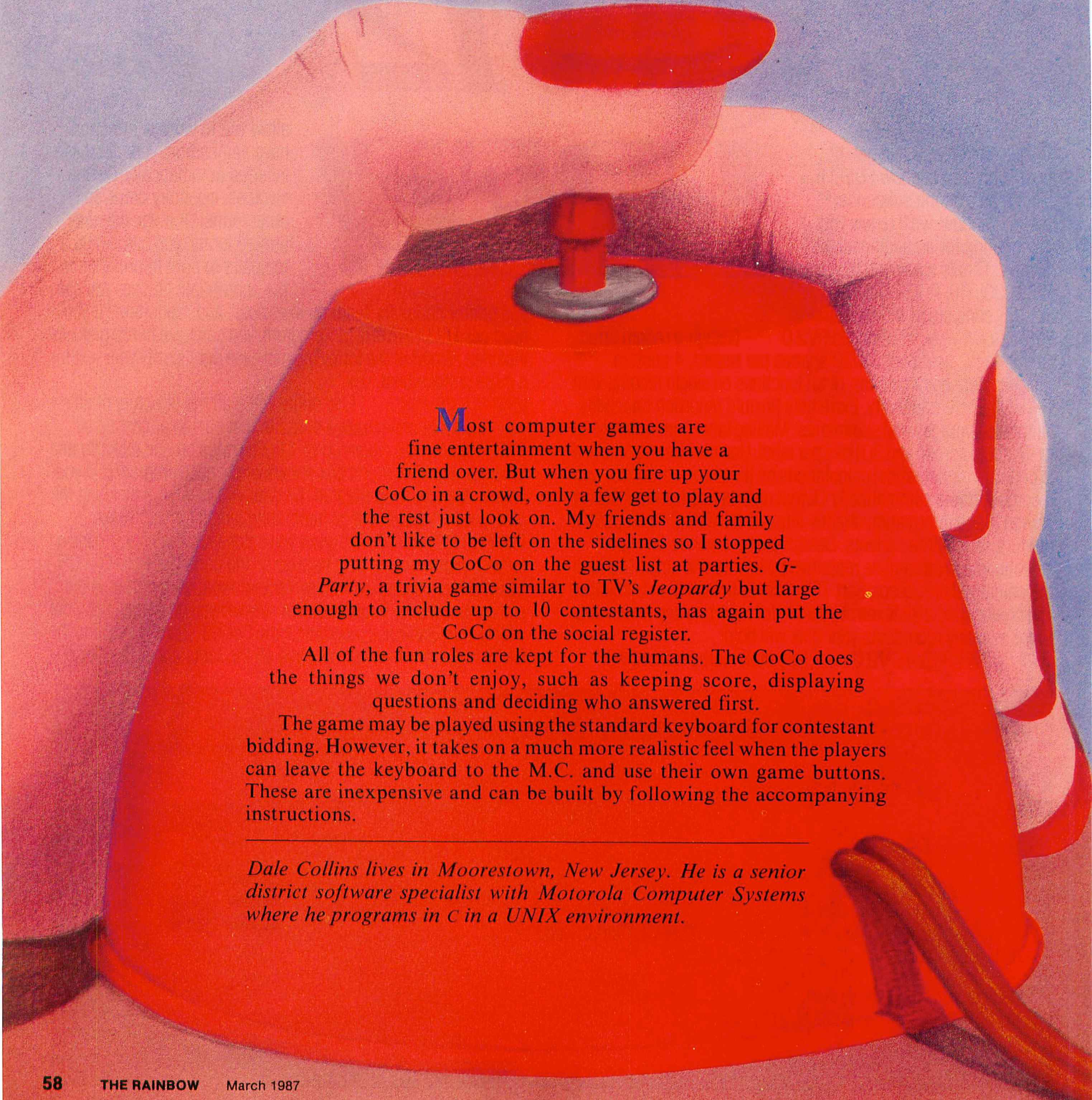

Most computer games are fine entertainment when you have a friend over. But when you fire up your CoCo in a crowd, only a few get to play and the rest just look on. My friends and family don't like to be left on the sidelines so I stopped putting my CoCo on the guest list at parties. *G-Party*, a trivia game similar to TV's *Jeopardy* but large enough to include up to 10 contestants, has again put the CoCo on the social register.

All of the fun roles are kept for the humans. The CoCo does the things we don't enjoy, such as keeping score, displaying questions and deciding who answered first.

The game may be played using the standard keyboard for contestant bidding. However, it takes on a much more realistic feel when the players can leave the keyboard to the M.C. and use their own game buttons. These are inexpensive and can be built by following the accompanying instructions.

Dale Collins lives in Moorestown, New Jersey. He is a senior district software specialist with Motorola Computer Systems where he programs in C in a UNIX environment.

32K
ECB

By Dale R. Collins

Playing the Game

Run the BASIC program *G-Party*. You must indicate whether you want the contestants to share the keyboard with the M.C. or use separate game buttons. Indicate whether you will be using question and picture files from the tape or disk.

Use Option 4 to identify the contestants. The M.C. enters the name, then that player must press his game button or a key 0 to 9 or A to Z. When there are no more contestants to be identified, press ENTER to display the player list. Pressing ENTER again gives the menu. Before each level of *G-Party* you must load your question file using Option 5.

Single and Double *G-Party*

In these rounds, the categories are displayed with the question values in a column-row grid. The name of the current player is displayed in the lower-left corner of the screen.

The player announces his choice, such as "Sew It Is for 200," and the M.C. keys in the column and row numbers. If this question is a daily or video double, the selecting player must specify the amount he wants to wager before he sees the question.

However, if this is a normal question, the CoCo displays the question and begins timing for a player to press his button. The first person to press his button is named on the screen and has a few seconds to answer. The M.C. must know the questions and answers in advance to be judge. Correct answers are logged with the right arrow, and incorrect answers with the left arrow. If no answer is logged before that player's time expires, or he is logged as incorrect, his score is debited and the question is once again fair game for any others who want to try. If no one has answered correctly and no one else wants to try, the answer is displayed until the M.C. presses ENTER.

The round continues until all questions are used. The M.C. then returns to the menu using an M to load the next question file and start the next round. During a round the M.C. may also use A to show the last answer, T to display the current total score or C to correct a player's score.

Final *G-Party*

Only those players with a score

Behind the Scenes: Building the Game Buttons

By Dale R. Collins

We love to watch TV game shows, imagining ourselves standing with the game button under our sweaty hand, believing we would leave the other contestants in the dust.

Until now, our attempts to mimic TV competition games have been limited by hardware. Two contestants can make do with the buttons on the joysticks, but for a greater number, they must all crowd around the keyboard and screen. At best, only three or four have a chance at active play. Contestants cannot become absorbed in the game because they must constantly shift to see the screen and press "their" key.

I will show you how to make a set of 10 individual game buttons that will set the contestants free to concentrate on the game. This is an excellent hardware project for a beginner for several reasons. First, the electronic components you will be working with are very inexpensive (less than $14) and readily available. Second, the components are all sturdy and not likely to be damaged by inexperience. Third, this hardware will only be connected to the computer when you have finished construction and are ready to use it. There is never a phase of construction during which your computer is "down." Fourth, you will not need to open your CoCo thereby voiding the warranty.

The operation of these buttons is a very simple thing. The joystick port is actually a device called an analog-to-digital converter. Normally it monitors very low-voltage values determined by positions of the joystick, and then estimates it on an integer scale from 0 to 63 through the function `JOYSTK(0)`. We are replacing the joystick with the set of game buttons which return unique voltages for each button pressed. Each button will always put out the same voltage, which is always expressed as the same integer 1 to 63. Thus, our basic program only needs to test the value in `JOYSTK(0)`. If it has a non-zero value, we can tell which button is pressed.

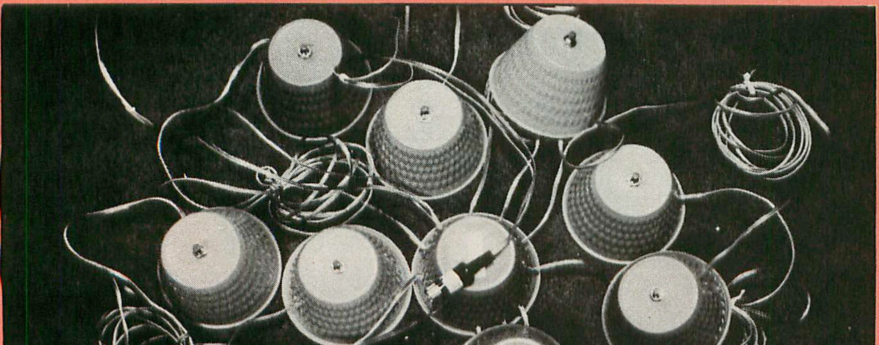

Photo of 10 game buttons and hub (center).

There is one caution to note. Because the voltages are so low and we are introducing many solder joints and lengths of wire, the values may waver a bit for each button. I recommend that when you test a button that normally yields a value of 47, you accept a range of 46 to 48 as a true value for that button.

Let's get down to the business of assembling the game buttons.

Drill the switch-mounting holes in the bottom of 10 margarine tubs and a hole for the wire in the side, close to the lip. The eleventh tub is to be the central location of the circuit. You will need to drill 10 holes for the wires to the switches and two more for the wires to the DIN plug. Drill them equally spaced around the side.

Cut the wire into 12 equal pieces and strip the ends back ¼ inch. Split one length into two single conductors.

Push a wire through the hole in the side of each button tub. Tie a knot in the wire so that when the wire is pulled from the outside of the tub there will be a little slack when the switch is mounted. Solder a conductor to each post of the switches. Mount the switches in the holes and put the lids on the tubs.

Slide the hood of the plug a few inches back onto the remaining pair and one greater than zero are allowed to play the final question. The current scores are displayed until the M.C. presses ENTER. The category is displayed and each player should write down how much of his score he will be risking. After all players are committed, the M.C. presses ENTER to display the question. He should allow the players about 30 seconds to write their answers before pressing ENTER. The players are asked their answers, which should be logged as correct with the right arrow or incorrect with the left arrow, and their wager. CoCo announces the winner.

Entering Question Files

You may create new sets of questions using Option 7. You will be prompted to first enter the category. Each question has three parts. First is the "special" field which is blank for most questions. If you want this question to be a daily double, put a 'D' in this field. To make it a video daily double, enter the name of the binary picture file to be loaded. The question and answer may each contain 60 characters. After you have entered a full set of questions, you may edit them individually using Option 8. Remember to save them using Option 6. You may print a list of a question set currently in memory using Option 9. ☐

46	246	4039	91
2026	176	4080	149
2095	67	4250	192
2135	102	4540	253
2212	100	5005	227
2390	110	5175	26
2545	161	6030	7
2940	113	END	103

The listing: GPARTY

```
1 REM    G-PARTY 1.0  09/29/86
BY DALE R. COLLINS
2 PCLEAR4:CLEAR6000
5 GOTO9900
20 REM PLAYER BID
21 PRINT@480,"
            ";:IFPA<1THEN70
22 IFPB$="K"THEN31
23 C=440:REM GAME-BUTTON INPUT
24 J=JOYSTK(0):C=C-1:IFC<1THEN70
25 IFJ<4THEN24
26 PL=99:FORI=0TONP-1
27 IFJ<PA(I)+2ANDJ>PA(I)-2THENPL
=I:PA(I)=0:PA=PA-1
28 NEXTI:IFPL=99THEN24
29 GOTO38
31 C=440:REM KEYBOARD INPUT
32 A$=INKEY$:C=C-1:IFC<1THEN70
33 IFA$=""THEN32
34 PL=999:FORI=0TONP-1
35 IFASC(A$)=PA(I)THENPL=I:PA(I)
=0:PA=PA-1
36 NEXTI:IFPL=999THEN32
38 PRINT@480,P$(PL);" - PLAYER";
40 REM CHECK ANSWER
41 C=400
42 A$=INKEY$:C=C-1:IFC<1THEN60
43 IFA$=""THEN42
```

QTY	Description	Radio Shack #
100 feet	22 gauge speaker wire	278-1385
1	component perfboard	276-149
1	6-pin DIN plug	274-020
10	switches norm open	275-1547
9	10K ohm ¼-watt res.	271-1335
1	22K ohm ¼-watt res.	271-1339
1	220K ohm ¼-watt res.	271-1350
11	soft margarine tubs with lids	

Figure 1: Parts List

single wire (3 conductors). Solder the single wire to Pin 1 and the double to pins 2 and 5. Solder a jumper wire connecting pins 2 and 3. Assemble the plug and lock the hood in place.

Push the second end of all button wires and plug wires into the eleventh tub. Tie knots in each so when pulled from the outside of the tub they will reach about 1 inch beyond the opposite lip.

Place all of the resistors on the board to construct the circuit in Figure 2. Place a totally stripped wire long enough to connect 11 holes on the board starting at the end of R11. Solder all connections on the board.

Solder one of the conductors of every button pair to a resistor junction starting at the free end of R1 up to the junction between R9 and R10. Solder the other conductor in each pair onto the totally stripped wire on the board. Solder the single wire from the DIN plug Pin 1 to the totally stripped wire. Solder the conductor from Pin 5 to R1 and from Pin 2 to the junction between R10 and R11.

Check your connection with Figure 2. If they match, put the lid on this tub.

The set of 10 game buttons should be connected to the right joystick port. Test each button by running the following BASIC program.

```
10 PRINT JOYSTK(0) : GOTO 10
```

The value shown on the screen when no button is pushed should be 0. Press one button at a time, noting the number for each. They should all be unique. If there are any problems check your connections against Figure 2. ☐

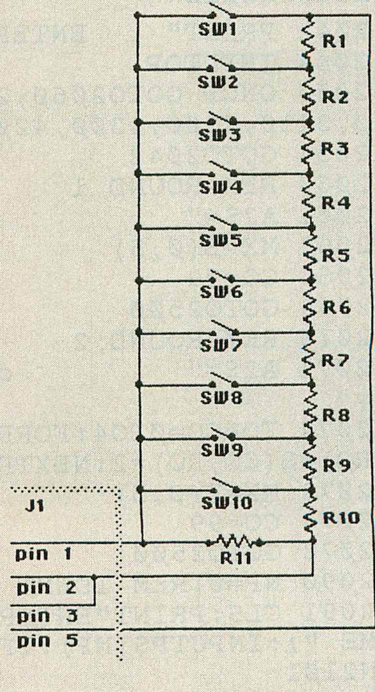

Figure 2

```
45 IFA$=CHR$(8)THEN60
46 IFA$<>CHR$(9)THEN42
50 REM GOOD ANSWER
51 PRINT@498,"GOOD  GOOD";
52 P2(PL)=P2(PL)+B(CO,RO):B(CO,R
O)=0:TU=PL
53 FORI=1TO20:NEXTI
54 GOTO2500
60 PRINT@498,"BAD   BAD";
61 P2(PL)=P2(PL)-B(CO,RO)
62 FORI=1TO20:NEXTI
64 IFDD=1THEN20
70 REM TIME LIMIT
72 B(CO,RO)=0
73 PRINT@384,"answer  ":PRINT"
 ";Q1$(CO,RO);:GOSUB502
74 GOTO2500
502 A$=INKEY$:IFA$=""THEN502
503 RETURN
2000 REM MENU
2005 CLS
2010 PRINT"         g-party"
2012 PRINT"---------------------
----------"
2014 PRINT"1. PLAY ROUND 1"
2016 PRINT"2. PLAY ROUND 2"
2018 PRINT"3. PLAY FINAL"
2020 PRINT"4. IDENTIFY PLAYERS"
2022 PRINT"5. LOAD QUESTIONS"
2024 PRINT"6. SAVE QUESTIONS"
2026 PRINT"7. ENTER QUESTIONS"
2028 PRINT"8. MODIFY QUESTIONS"
2030 PRINT"9. PRINT Q&A SHEET"
2040 PRINT"---------------------
----------"
2042 PRINT"     ENTER OPTION ";:
2044 INPUTOP
2050 ONOP GOTO2060,2070,4500,209
0,2110,2200,4300,4200,6000
2054 GOTO2042
2060 REM ROUND 1
2061 A2$="            g-party"
2063 MX=B(0,5)
2064 CO=99
2068 GOTO2500
2070 REM ROUND 2
2071 A2$="         double g-part
y"
2072 FORCO=0TO4:FORRO=0TO5:B(CO,
RO)=B(CO,RO)*2:NEXTRO:NEXTCO
2073 MX=B(0,5)
2074 CO=99
2078 GOTO2500
2090 NP=0:REM IDENT PLAYERS
2091 CLS:PRINT"ENTER PLAYER'S NA
ME ";:INPUTP$(NP):IFP$(NP)=""THE
N2101
2092 IFPB$="K"THEN2098
2093 PRINT:PRINT"PRESS YOUR BUTT
ON TO REGISTER";
2094 P1(NP)=JOYSTK(0):IFP1(NP)<4
THEN2094
2095 K=JOYSTK(0):IFK>P1(NP)THENP
1(NP)=K
2096 NP=NP+1:GOTO2091
2098 PRINT"PRESS YOUR KEY TO REG
ISTER";
2099 GOSUB502
2100 P1(NP)=ASC(A$):NP=NP+1:GOTO
2091
2101 GOSUB2300
2102 GOSUB502
2103 TU=RND(NP)-1:GOTO2000
2110 REM LOAD Q'S
2120 FORI=0TO4
2121 B(I,0)=50
2122 B(I,1)=100
2123 B(I,2)=200
2124 B(I,3)=300
2125 B(I,4)=400
2126 B(I,5)=500
2129 NEXTI
2131 CLS:PRINT"load questions fr
om ";:IFMD$="D"THEN2140
2132 PRINT"tape":PRINT:PRINT"REA
DY TAPE - PRESS PLAY":PRINT:PRIN
T"ENTER FILENAME ";:INPUTB$
2133 OPEN"I",#-1,B$
2134 FORI=0TO4:FORJ=0TO5
2135 INPUT#-1,H$(I,J),Q2$(I,J),Q
$(I,J),Q1$(I,J)
2136 NEXTJ:NEXTI
2137 CLOSE#-1
2139 GOTO2000
2140 PRINT"disk":PRINT
2142 PRINT"ENTER FILENAME ";:INP
UTB$:B$=B$+"/DAT"
2144 OPEN"D",#1,B$,133
2146 FIELD #1,5 AS C1$,8 AS C2$,
60 AS C3$,60 AS C4$
2148 K=0
2150 FORI=0TO4:FORJ=0TO5
2152 K=K+1:GET#1,K
2154 H$(I,J)=C1$:Q2$(I,J)=C2$:Q$
(I,J)=C3$:Q1$(I,J)=C4$
2156 NEXTJ:NEXTI
2160 CLOSE#1
2199 GOTO2000
2200 REM SAVE QUESTIONS
2201 CLS:PRINT"save questions to
 ";:IFMD$="D"THEN2210
2202 PRINT"tape":PRINT:PRINT"REA
DY TAPE - PRESS PLAY & RECORD ":
PRINT"ENTER FILENAME ";:INPUTB$
2203 OPEN"O",#-1,B$
2204 FORI=0TO4:FORJ=0TO5
2205 PRINT#-1,H$(I,J),Q2$(I,J),Q
$(I,J),Q1$(I,J)
2206 NEXTJ:NEXTI
2207 CLOSE#-1
```

```
2209 GOTO2000
2210 PRINT"disk":PRINT
2212 PRINT"ENTER FILENAME ";:INP
UTB$:B$=B$+"/DAT"
2214 OPEN"D",#1,B$,133
2216 FIELD#1,5 AS C1$,8 AS C2$,6
0 AS C3$,60 AS C4$
2218 K=0
2220 FORI=0TO4:FORJ=0TO5
2224 LSETC1$=H$(I,J):LSETC2$=Q2$
(I,J):LSETC3$=Q$(I,J):LSETC4$=Q1
$(I,J)
2225 K=K+1:PUT#1,K
2226 NEXTJ:NEXTI
2240 CLOSE#1
2290 GOTO2000
2300 REM DISPLAY PLAYERS
2310 CLS:PRINT" total  players":
PRINT
2311 FORPA=0TONP-1:PA(PA)=PA:NEX
TPA
2314 FORI=1TONP-1:FORJ=1TONP-1
2316 IFP2(PA(J))>P2(PA(J-1))THEN
K=PA(J-1):PA(J-1)=PA(J):PA(J)=K
2318 NEXTJ:NEXTI
2320 FORI=0TONP-1
2322 PRINTUSING"+##### %
         % ###";P2(PA(I)),P$(PA
(I)),P1(PA(I))
2324 NEXTI
2390 RETURN
2400 REM GENERAL BOARD
2410 CLS:PRINTA2$
2420 FORJ=0TO5:FORI=0TO4
2422 PRINT".";:PRINTUSING"%   %"
;H$(I,J);
2424 NEXTI:PRINT"."
2426 NEXTJ
2450 PRINT"----1-----2-----3----
-4-----5--"
2460 FORJ=0TO5
2461 FORI=0TO4
2462 PRINT"!";:IFB(I,J)=0THENPRI
NT"     ";ELSEPRINTUSING"#### ";
B(I,J);
2463 NEXTI:PRINTUSING"#";J+1
2464 NEXTJ
2470 PRINT"---------------------
----------"
2480 PRINTP$(TU);" - select";:PR
INT@504,"T A C M";
2490 RETURN
2500 REM NORMAL PLAY
2510 GOSUB2400
2520 GOSUB502
2530 IFA$="M"THEN2000
2535 IFA$="C"THEN2900
2539 IFA$<>"T"THEN2545
2540 GOSUB2300
2541 GOSUB502
2542 GOTO2500
2545 IFA$="A"THENGOSUB2700:GOTO2
500
2560 IFA$<"1"THEN2520
2562 IFA$>"5"THEN2520
2564 CO=VAL(A$)-1
2570 GOSUB502
2572 IFA$<"1"THEN2520
2574 IFA$>"6"THEN2520
2576 RO=VAL(A$)-1
2578 IFB(CO,RO)=0THEN2500
2580 GOTO5000
2700 REM SHOW ANSWER
2710 IFCO=99THENRETURN
2720 CLS
2730 PRINT"question:":PRINT"     "
;Q$(CO,RO):PRINT:PRINT
2740 PRINT"answer:":PRINT"     ";Q
1$(CO,RO)
2780 GOSUB502
2790 RETURN
2900 REM CORRECT A PLAYER'S SCOR
E
2910 GOSUB2300
2920 PRINT@448,"PLAYER TO CORREC
T: PLEASE IDENT";
2925 IFPB$="K"THEN2950
2930 J=JOYSTK(0):IFINKEY$<>""THE
N2990
2932 IFJ<4THEN2930
2940 PL=99:FORI=0TONP-1
2942 IFJ<P1(I)+2ANDJ>P1(I)-2THEN
PL=I
2944 NEXTI
2946 IFPL=99THEN2930
2948 GOTO2960
2950 GOSUB502
2952 PL=999:FORI=0TONP-1
2954 IFASC(A$)=P1(I)THENPL=I
2956 NEXTI:IFPL=999THEN2950
2960 PRINT@448,"ENTER CORRECTION
 AMT FOR ";P$(PL);"'S SCORE";:IN
PUTK
2970 P2(PL)=P2(PL)+K
2980 GOSUB2300
2982 FORI=1TO1000:NEXTI
2990 GOSUB2500
3000 REM INPUT INTO A$
3010 A=0:A$=""
3015 PRINT@A9,"? ";A$;CHR$(255);
" ";
3020 Z$=INKEY$:IFZ$=""THEN3020
3030 IFZ$=CHR$(13)THENRETURN
3040 IFZ$<>CHR$(8)THENA=A+1:A$=A
$+Z$:GOTO3015
3050 A=A-1:IFA<1THEN3010
3060 A$=LEFT$(A$,A):GOTO3015
4020 REM DISPLAY CATAORY
4030 PRINT@32,"catagory ";CO+1
4032 PRINT@064," >-----<";
```

```
4035 FORJ=0TO5:J1=096+J*32:PRINT
@J1,USING"  %     %   ";H$(CO,J)
;:NEXTJ
4039 PRINT@288," >-----<";
4040 RETURN
4045 REM INPUT CATAGORY
4050 FORJ=0TO5
4052 J1=096+(J*32):A9=J1:GOSUB30
00
4053 IFLEN(A$)>5THENA$=LEFT$(A$,
5)
4054 IFA$<>""THENH$(CO,J)=A$
4056 PRINT@J1,USING"  %    %
";H$(CO,J);
4058 NEXTJ
4059 RETURN
4070 REM INPUT Q & A
4071 PRINT@320,USING"    %
%  # %  %  %        %";"question
",RO+1,"type",Q2$(CO,RO);
4072 PRINT@352,USING"%% %

                   %";"q",Q$(CO,
RO);
4074 PRINT@416,USING"%% %

                   %";"a",Q1$(CO
,RO);
4078 A9=340:GOSUB3000:IFLEN(A$)>
8THENA$=LEFT$(A$,8)
4080 IFA$<>""THENQ2$(CO,RO)=A$
4082 PRINT@340,USING"    %    %
 ";Q2$(CO,RO);
4084 A9=353:GOSUB3000:IFLEN(A$)>
60THENA$=LEFT$(A$,60)
4086 IFA$<>""THENQ$(CO,RO)=A$
4088 PRINT@353,USING"  %

                   %";Q$(CO,RO);
4090 A9=417:GOSUB3000:IFLEN(A$)>
60THENA$=LEFT$(A$,60)
4092 IFA$<>""THENQ1$(CO,RO)=A$
4094 PRINT@417,USING"  %

                   %";Q1$(CO,RO)
;
4098 RETURN
4200 REM MODIFY
4210 CLS:PRINT" modify screen":P
RINT
4220 INPUT"qUESTION OR cATAGORY"
;A$
4222 IFA$<>"Q"ANDA$<>"C"THEN2000
4230 INPUT"WHICH CATAGORY (1-5)"
;CO
4232 IFCO<1THEN2000
4234 IFCO>5THEN2000
4236 CO=CO-1
4238 IFA$="Q"THEN4260
```

```
4240 CLS:PRINT"          modify
catagory":GOSUB4020
4244 GOSUB4045:GOTO2000
4250 GOTO2000
4260 INPUT"WHICH ROW (1-6)";RO
4262 IFRO<1THEN2000
4264 IFRO>6THEN2000
4266 RO=RO-1
4280 CLS:PRINT"          modify
question":GOSUB4020
4282 GOSUB4070
4290 GOTO2000
4300 REM COMPLETE ENTER
4310 CLS:PRINT"          enter n
ew board"
4320 FORCO=O TO4
4322 GOSUB4020
4326 GOSUB4045
4330 FORRO=0TO5
4332 GOSUB4070
4340 NEXTRO
4350 NEXTCO
4390 GOTO2000
4500 REM FINAL
4505 GOSUB2300
4507 GOSUB502
4510 CLS:PRINT"          final g
-party":PRINT@128,"catagory:"
4520 PRINT@160,H$(0,0);H$(0,1);H
$(0,2);H$(0,3);H$(0,4);H$(0,5);
4530 GOSUB502
4540 PRINT@256,"question:"
4550 PRINT@291,Q$(0,0);
4560 GOSUB502
4575 PA=0:FORI=0TONP-1:IFP2(PA(I
))>0THENPA=PA+1ELSEPS(PA(I))=0
4580 NEXTI
4600 PB=PA:FORI=PB-1TO0STEP-1:PB
(PB-1-I)=PA(I):NEXTI
4610 FORA9=0TOPB-1
4620 GOSUB2300
4622 PRINT@448,P$(PB(A9));
4625 GOSUB502
4626 IFA$=CHR$(8)THENDD=-1:GOTO4
630
4627 IFA$=CHR$(9)THENDD=1:GOTO46
30
4628 GOTO4625
4630 PRINT"'S WAGER ";:INPUTK
4640 P2(PB(A9))=P2(PB(A9))+K*DD
4650 NEXTA9
4660 GOSUB2300
4670 PRINT@448,"congradulations
";P$(PA(0));
4680 GOSUB502
4690 GOTO2000
5000 REM DISPLAY QUESTION
5002 DD=1
5003 A$=INKEY$:IFA$<>""THENPRINT
```

```
@448,"someone has their key push
ed";:goto5003
5004 IFPB$="K"THEN5006
5005 J=JOYSTK(0):IFJ>1THENPRINT@
448,"someone has their button pu
shed";:GOTO5005
5006 IFQ2$(CO,RO)>"        "THEN
5100
5007 FORPA=0TONP-1:PA(PA)=P1(PA)
:NEXTPA
5010 CLS:PRINT"      question"
5050 PRINT@131,Q$(CO,RO)
5090 GOTO20
5100 REM DAILY DOUBLE
5105 PL=TU:DD=2
5110 CLS:PRINT@128,"***    D A I
 L Y     ***":PRINT@160,"      D
 O U B L E"
5120 IFQ2$(CO,RO)<>"A       "AND
Q2$(CO,RO)<>"D       "THENPRINT@
096,"       v i d i o"
5130 IFQ2$(CO,RO)="A       "THEN
PRINT@096,"       a u d i o"
5140 PRINT@224,"player - ";P$(PL
);
5150 PRINT@256,"total  - ";P2(PL
);
5160 K=P2(PL):IFK<MX THEN K=500
5165 PRINT@320,"limit  - ";K
5170 PRINT@336,"";:INPUT"WAGER "
;B(CO,RO):IFB(CO,RO)>K THEN5170
5175 CLS:PRINT"      question":
PRINT@131,Q$(CO,RO);
5177 IFQ2$(CO,RO)="D       "THEN
5198
5178 IFQ2$(CO,RO)="A       "THEN
5190
5180 IFMD$="D"THENQ2$(CO,RO)=Q2$
(CO,RO)+"/BIN":LOADMQ2$(CO,RO) E
LSE CLOADMQ2$(CO,RO)
5182 PMODE4,1:SCREEN1,1:FORI=1TO
100:NEXTI:GOTO5198
5190 AUDIOON:MOTORON
5191 GOSUB502
5192 AUDIOOFF:MOTOROFF
5198 GOTO40
6000 REM PRINT Q & A LIST
6010 PRINT#-2,"     LIST OF Q &
A FOR FILE ";B$
6012 PRINT#-2
6020 FORCO=0TO4
6022 PRINT#-2:PRINT#-2,"***  ";
6024 FORJ=0TO5:PRINT#-2,H$(CO,J)
;" ";:NEXTJ:PRINT#-2," "
6026 FORRO=0TO5
6028 PRINT#-2,USING"# # %% %

                      % %
 %";CO+1,RO+1,"Q",Q$(CO,RO),Q2$(
CO,RO)
6030 PRINT#-2,USING"    %% %

                     %";"A",Q1$
(CO,RO)
6032 PRINT#-2
6034 NEXTRO
6036 NEXTCO
6090 GOTO2000
9900 REM SETUP
9910 DIMB(5,6),P1(10),P2(10),PA(
10),PB(10)
9920 DIMP$(10),Q$(5,6),Q1$(5,6),
Q2$(5,6),H$(5,6)
9930 CLS:PRINT" WELCOME TO CO-CO
 g-party!"
9932 PRINT@128,"WILL YOU USE (G)
AME-BUTTONS OR  (K)EYBOARD FOR P
LAYER BIDDING";:INPUTPB$:IFPB$<>
"G"ANDPB$<>"K"THEN9932
9938 IFPEEK(&HC000)<>&H44 THEN M
D$="T":GOTO9990
9940 PRINT@256,"WILL YOU USE (D)
ISK OR (T)APE  FOR FILE STORAGE
";:INPUTMD$:IFMD$<>"D"ANDMD$<>"T
"THEN9940
9990 GOTO2000
```

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RAINBOW ON DISK

Here's a program that's just your "type"

The Key to Success

By Leonard Hyre

This program, *CoCoType III*, is a typing tutor for your Color Computer 3. It lets would-be typists learn proper typing techniques, and may also be used by those of us whose typing skills are a bit rusty. To utilize *CoCoType III*, you must have a Color Computer 3 and a compatible 80-column RGB display, such as the Tandy CM-8 monitor.

After the title screen is presented, the program goes right to work, allowing the user to select from four different options. The first option, Beginner Exercises, is ideal for first-timers. Just place your fingers on the highlighted home keys and type in the displayed exercise. Starting with the most easily mastered keys, this option allows the beginner to get comfortable with the idea of typing without looking at the keyboard. After an exercise is correctly typed four times, a new one appears.

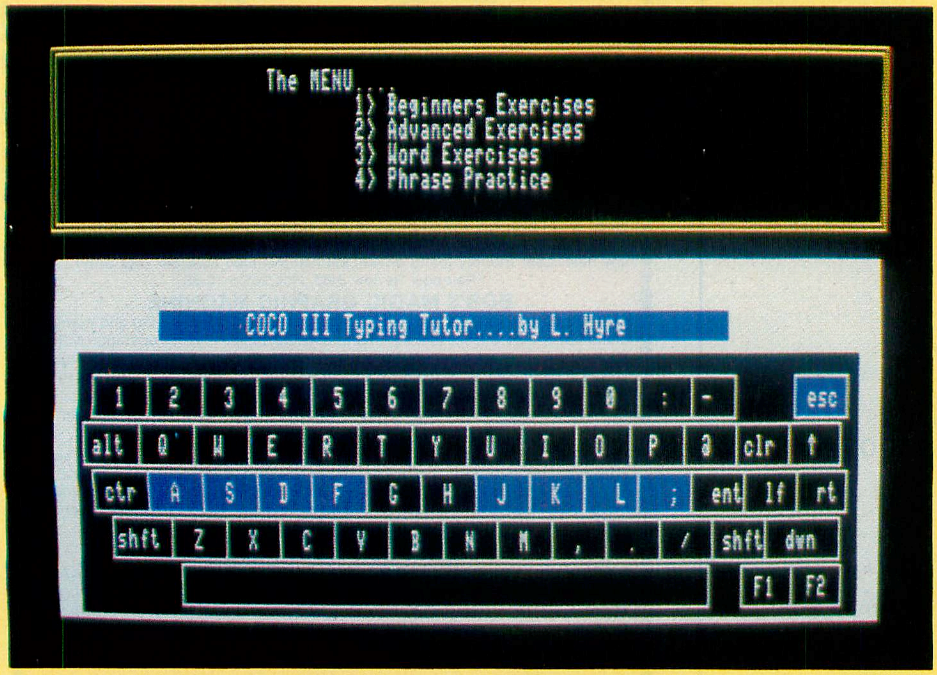
The second option on the main menu is Advanced Exercises. These are similar in style to Option 1, but take in the "tough" keys, such as the numbers. Option 3 presents complete words for the user to enter. It is suggested that this exercise be repeated until real proficiency is attained.

The fourth option is Phrase and Sentence Exercises. As suggested by the title, the idea is to type in complete sentences. If typed correctly, a new one appears. If not, the same exercise is repeated. Completing 24 sentences correctly here will send the program off to the graduation routine.

A few pointers concerning learning to type are in order here. Always rest your fingers on the highlighted home keys, all other keys being reached from this location. Resist looking at the keyboard as much as possible. You will find it very natural to press the proper key without looking after only a few short sessions. Remember, you will not master typing in a few minutes. Short practice sessions over a period of a few weeks will be required before you begin to type confidently. Lastly, don't worry about speed! Speed will come automatically as you learn to instinctively press the correct keys.

Program flow is relatively straightforward, with no mind-boggling techniques to ponder. As such, it may serve well as an introduction to programming, or as a bit of a tutorial for those of you new to the CoCo 3. The use of the high resolution screens presents some new concepts to those of us who have been banging on the CoCo 1 and CoCo 2 keys for years.

When typing in the program, I make one strong suggestion. Line 130, which enables high-speed operation, also creates problems when trying to load or save files. You may wish to defer typing in this line until after the rest of the


The MENU...
1) Beginners Exercises
2) Advanced Exercises
3) Word Exercises
4) Phrase Practice
COCO III Typing Tutor....by L. Hyre
1 2 3 4 5 6 7 8 9 0 : - esc
alt @ Q W E R T Y U I O P @ clr ↑
ctr A S D F G H J K L ; ent lf rt
shft Z X C V B N M , . / shft dwn
F1 F2

Leonard Hyre is the author of Federal Hill Software's Handicapper *series and a number of articles for RAINBOW. He also published several articles in RAINBOW's sister publication, SOFT SECTOR, and is the author of* Sanyopoly, *a new Sanyo game from Michigan Software.*

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program is typed in and working. Alternatively, you could enter 130, 170 and 1840 as your first lines. Then, pressing the BREAK key will restore the machine to slow speed and allow saving and loading files automatically. This, by the way, is an ideal example of the value of the new `ON BRK` command in CoCo 3 BASIC.

The first subroutine to be called by the program is the title routine (lines 1630 through 1800). Please forgive me for the length of this routine, but I was so excited with the new color and graphics I couldn't help myself. After drawing the typewriter and scrolling up the title, a return is made to the main program.

Next, we need to read in all the data needed to define the various exercises. This is handled by the routine contained in lines 1440 through 1510. Nothing fancy here, but be especially careful typing them in, as an error in the data could give very misleading errors at run time.

At last, ready to start to work, the program draws a representation of the full CoCo 3 keyboard on the screen. This serves to help users keep their eyes on screen and not on the actual keyboard. Note that the home keys are highlighted in a different color from the regular keys. The keyboard drawing (subroutine in Line 1140) remains on the screen regardless of which exercise is being used.

Selections 1 and 2 from the main menu are controlled from a loop found in lines 750 through 920. When called, the routine first clears the upper work area (using `HPUT` to put a black mask over the old text), then presents the exercise to be typed and awaits user input.

Because text uses the `HPRINT` rather than `PRINT` command to put text on the Hi-Res screen, the `INPUT` statement that would otherwise be used in this type of situation is not usable. As a substitute, the program creates and checks strings made up of a number of `INKEY$` commands. For example, if the exercise is "SFAD," the `INKEY$` will loop a number of times equal to the length of the exercise.

Starting with a string of " " (nothing), the loop adds the `INKEY$` input to the start string on each pass. After the first pass, the string will be 'S', after the second, "SF," etc. When the end is reached, this string is compared to the exercise presented to check for correctness, and appropriate action is taken.

Incorrect answers result in a flash of the screen (using `PALETTE`) and presentation of the same exercise. Correct answers update the "Number Correct" and continue the exercise loop. Several error traps are built in and the option to exit to the menu at any prompt is always available. The user just presses the question mark key and the program goes back to the main menu.

Menu options 3 and 4 basically work the same way, with minor variations in display and error-handling. Note that with Option 4, Phrase Practice, the user can abort entry of a sentence by pressing ENTER-? at any time.

Throughout the program listing, you will find numerous uses of `PALETTE`, `HPRINT`, `HCOLOR`, `HBUFF`, `HPUT`, `HGET` and other new CoCo 3 commands. By noting the use in the listing and comparing it with actions on screen, you may be able to get a few useful tips for your own programming.

Should you encounter difficulty in entering the program, feel free to contact me, either by mail at P.O. Box 403, Cambridge MD 21613, or by phone at (301) 228-0064 (after 5 p.m. EST). You may also leave me messages on the Delphi network in the CoCo SIG (my username is MUNCH). I hope you find *CoCoType III* a useful addition to your library of software for the new and powerful Color Computer 3. ☐

170	47	1250	102
330	120	1400	93
510	183	1480	215
650	54	1610	89
800	124	1710	119
940	232	END	80
1100	123		

The listing: COCOTYPE

```
10 '****************************
********************
20 '*           The COCO III TYP
ING TUTOR          *
30 '*
                   *
40 '*               by Leonard H
yre                *
50 '*
                   *
60 '*  REQUIRES COCO III WITH RG
B 80 COL.DISPLAY   *
70 '*
                   *
80 '****************************
********************
85 '
100 DIM A$(36),B$(36),C$(18),D$(
12)
110 '
120 HBUFF 1,6400
130 POKE 65497,0:REM *** IT IS R
ECOMMENDED THAT THIS LINE BE TYP
ED IN LAST ***
140 '
150 '** ON BRK Allows Restoratio
n To Normal Operation If Break P
ressed
160 '
170 ON BRK GOTO 1840
180 '
190 GOSUB 1630:'** This is the T
ITLE screen
200 GOSUB 1440:'** This READS in
 the DATA statements
210 GOSUB 1140:'** This draws th
e KEYBOARD display
220 '
```

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```
230 '** Menu Display Created Her
e
240 '
250 PALETTE 1,255:PALETTE 2,54:H
COLOR 1,0:HPRINT(20,1),"The MENU
....":HPRINT(28,2),"1> Beginners
 Exercises":HPRINT(28,3),"2> Adv
anced Exercises":HPRINT(28,4),"3
> Word Exercises
260 HPRINT(28,5),"4> Phrase Prac
tice"
270 CH$=INKEY$:IF CH$=""THEN 270
280 IF VAL(CH$)<1 OR VAL(CH$)>4
THEN 270
290 HPUT(140,5)-(400,56),1,PSET
300 ON VAL(CH$) GOTO 750,750,340
,570
310 '
320 '*** ROUTINE FOR SELECTION 3
 ***
330 '
340 PALETTE 2,50:PALETTE 3,38
350 HCOLOR 2:HPRINT(1,1),"Word P
ractice.....":HCOLOR 3:HPRINT(56
,1),"'?' at prompt=MENU":HCOLOR
1,0
360 HPRINT(63,3),"DON'T WORRY":H
PRINT(63,4),"ABOUT SPEED"
370 HCOLOR 2:HLINE(500,20)-(594,
42),PSET,B
380 HCOLOR 1:HPRINT(14,6),"Repea
t These Exercises Until You Can
Type Them Smoothly"
390 FOR E=1 TO 18
400 HPRINT(20,2),"Here is your w
ord....":HPRINT(42,2),C$(E)
410 HCOLOR 2:HPRINT(34,3),"Type.
...":HCOLOR 1
420 AN$=""
430 FOR LX=1 TO LEN(C$(E))
440 TP$=INKEY$:IF TP$=""THEN 440
 ELSE IF TP$="?"THEN GOSUB 1560:
GOTO 250 ELSE 450
450 AN$=AN$+TP$
460 HPRINT(42,3),AN$
470 NEXT LX
480 IF AN$=C$(E) THEN PLAY"T130V
15O3EO4EO5EP32O3EO4EO5E"
490 IF AN$<>C$(E) THEN PALETTE 0
,53:PLAY"O1T64CG":PALETTE 0,0:E=
E-1
500 HCOLOR 0:HPRINT(42,2),C$(E):
HPRINT(42,3),AN$:HCOLOR 1
510 NEXT E
520 GOTO 390
530 GOTO 530
540 '
550 ' *** ROUTINE FOR PHRASE EXE
RCISES
560 '
570 PALETTE 2,27:PALETTE 3,46
580 HCOLOR 2:HPRINT(1,1),"Words
and Sentence Accuracy....":HCOLO
R 3:HPRINT(60,1),"'?'at prompt=M
ENU":HCOLOR 1:TC=0
590 HPRINT(14,6),"24 Correct Req
uired!":HCOLOR 2:HPRINT(50,6),"C
orrect=":HPRINT(59,6),TC:HPRINT(
60,2),"<RET>=ABORT"
600 FOR E=1 TO 12
610 HCOLOR 2:HPRINT(1,2),"Your P
hrase Is....":HCOLOR 1:HPRINT(20
,2),D$(E)
620 HCOLOR 3:HPRINT(14,3),"Type-
>":HCOLOR 1
630 AN$=""
640 FOR LX=1 TO LEN(D$(E))
650 TP$=INKEY$:IF TP$=""THEN 650
 ELSE IF TP$="?"THEN GOSUB 1560:
GOTO 250 ELSE IF TP$=CHR$(13) TH
EN 690 ELSE 660
660 AN$=AN$+TP$
670 HPRINT(20,3),AN$:NEXT LX
680 IF AN$=D$(E) THEN PLAY"T130V
15O3EO4EO5EP32O3EO4EO5E":HCOLOR
0:HPRINT(59,6),TC:TC=TC+1:HCOLOR
 2:HPRINT(59,6),TC:HCOLOR 1:IF T
C=24 THEN 1050
690 IF AN$<>D$(E) THEN PALETTE 0
,53:PLAY"O1T64CG":PALETTE 0,0:E=
E-1
700 HCOLOR 0:HPRINT(20,2),D$(E):
HPRINT(20,3),AN$:HCOLOR 1
710 NEXT E
720 '
730 '*** ROUTINES FOR SELECTIONS
 1 AND 2
740 '
750 PALETTE 2,53:PALETTE 3,36:FO
R E=1 TO 36:TI=0:IF VAL(CH$)=1 T
HEN HPRINT(1,1),"Beginners Exerc
ises" ELSE HPRINT(1,1),"Advanced
 Exercises"
760 HCOLOR 3:HPRINT(60,1),"'?'at
 prompt=MENU"
770 HCOLOR 2:HPRINT(1,2),"Here i
s the Exercise...."
780 HCOLOR 1:HPRINT(23,6),"Type
Each Exercise Correctly 4 Times"
790 IF VAL(CH$)=1 THEN HPRINT(26
,2),A$(E) ELSE HPRINT(26,2),B$(E
)
800 HCOLOR 2:HPRINT(61,2),"Times
 Perfect=":HPRINT(75,2),TI
810 HCOLOR 1:HPRINT(24,3),"->"
820 AN$=""
830 FOR LX=1 TO 4
840 TP$=INKEY$:IF TP$=""THEN 840
```

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```
 ELSE IF TP$="?"THEN GOSUB 1560:
GOTO 250
850 AN$=AN$+TP$
860 HCOLOR 2:HPRINT(26,3),AN$
870 NEXT
880 IF AN$=A$(E) OR AN$=B$(E) TH
EN PLAY"T255O5CDEFG":HCOLOR 0:HP
RINT(75,2),TI:HCOLOR 2:TI=TI+1:H
PRINT(75,2),TI:HCOLOR 1
890 IF CH$="1"AND AN$<>A$(E) OR
CH$="2" AND AN$<>B$(E) THEN PALE
TTE 0,53:PLAY"O1T64CEG":FOR DL=1
 TO 10:NEXT:PALETTE 0,0
900 HCOLOR 0:HPRINT(26,3),AN$
910 IF CH$="1" AND TI=4 THEN HCO
LOR 0:HPRINT(26,2),A$(E):HCOLOR
1:NEXT ELSE IF CH$="1" THEN GOTO
 820
920 IF CH$="2" AND TI=4 THEN HCO
LOR 0:HPRINT(26,2),B$(E):HCOLOR
1:NEXT ELSE GOTO 820
930 '
940 '** This is the GRADUATION C
ertificate
950 '
960 PALETTE RGB:WIDTH 40:HSCREEN
 2:HCLS 8
970 HCOLOR 1
980 HLINE(0,0)-(319,191),PSET,B
990 HDRAW"BM240,50;C1U20E20R30F2
0D20G20L30H20"
1000 HPAINT(260,40),1,1
1010 HCOLOR 3:HPRINT(32,4),"GOLD
-":HPRINT(32,5),"MEDAL":HLINE(24
8,27)-(300,52),PSET,B
1020 HCOLOR 2:HPRINT(34,2),"*":H
PRINT(34,7),"*"
1030 HCOLOR 5:HPRINT(5,5),"GRADU
ATION CERTIFICATE"
1040 HCOLOR 7:HLINE(24,32)-(230,
52),PSET,B:HCOLOR 0:HLINE(22,30)
-(232,54),PSET,B
1050 HCOLOR 4:HPRINT(2,12),"You
are hereby awarded a certificate
":HPRINT(3,14),"for the 'CC-3 TY
PING TUTOR COURSE'"
1060 HCOLOR 3:HLINE(10,82)-(310,
126),PSET,B
1070 HCOLOR 5:HPRINT(1,16),STRIN
G$(38,"*")
1080 HCOLOR 3:HPRINT(1,18),STRIN
G$(38,"*")
1090 HCOLOR 1:HPRINT(1,20),STRIN
G$(38,"*")
1100 AK$=INKEY$:IF AK$=""THEN 11
00 ELSE 1840
1110 '
1120 '** Here is where the KEYBO
ARD is created
```

```
1130 '
1140 PALETTE RGB:WIDTH 80
1150 PALETTE 0,0:PALETTE 3,8
1160 PALETTE 1,255:PALETTE 2,54
1170 HSCREEN 4:HCOLOR 1,0
1180 HCLS 0:HGET(140,5)-(400,56)
,1
1190 HLINE(20,100)-(600,190),PSE
T,B:HLINE(5,70)-(615,195),PSET,B
1200 HPRINT(3,14),"   1    2
3    4    5    6    7    8    9
   0    :    -        esc"
1210 HPRINT(2,16),"  alt   Q
W    E    R    T    Y    U    I
   O    P    @   clr   ^"
1220 HPRINT(3,18),"  ctr   A
S    D    F    G    H    J    K
    L    ;   ent  lf   rt"
1230 HPRINT(4,20),"  shft   Z
 X    C    V    B    N    M    ,
    .    /   shft  dwn"
1240 HPRINT(64,22)," F1    F2"
1250 HLINE(32,108)-(505,122),PSE
T,B:HLINE(550,108)-(590,122),PSE
T,B
1260 FOR L=72 TO 505 STEP 40:HLI
NE(L,108)-(L,122),PSET:NEXT L
1270 HLINE(26,124)-(585,138),PSE
T,B
1280 FOR L=66 TO 560 STEP 40:HLI
NE(L,124)-(L,138),PSET:NEXT L
1290 HLINE(32,140)-(590,154),PSE
T,B
1300 FOR L=72 TO 590 STEP 40:HLI
NE(L,140)-(L,154),PSET:NEXT L
1310 HLINE(45,156)-(585,170),PSE
T,B
1320 FOR L=88 TO 560 STEP 40:HLI
NE(L,156)-(L,170),PSET:NEXT L
1330 HLINE(95,172)-(485,186),PSE
T,B:HLINE(510,172)-(586,186),PSE
T,B:HLINE(548,172)-(548,186),PSE
T
1340 HPAINT(10,85),1,1
1350 HCOLOR 3,1:HLINE(80,87)-(50
0,96),PSET,BF
1360 HCOLOR 1,4:HPRINT(18,11),"C
OCO III Typing Tutor....by L. Hy
re"
1370 HCOLOR 2,1
1380 HLINE(0,0)-(619,60),PSET,B:
HLINE(4,2)-(616,58),PSET,B:HCOLO
R 1,0
1390 HPAINT(90,142),3,1:HPAINT(1
40,142),3,1:HPAINT(180,142),3,1:
HPAINT(220,142),3,1:HPAINT(340,1
42),3,1:HPAINT(380,142),3,1:HPAI
NT(420,142),3,1:HPAINT(460,142),
3,1:HPAINT(560,120),3,1
```

```
1400 RETURN
1410 '
1420 '*** DATA FOR EXERCISES REA
D IN FROM HERE ***
1430 '
1440 FOR X=1 TO 36:READ A$(X):NE
XT:FOR X=1 TO 36:READ B$(X):NEXT
:FOR X=1 TO 18:READ C$(X):NEXT:F
OR X= 1 TO 12:READ D$(X):NEXT
1450 DATA SFAD,FADS,KJL;,J;LK,GH
TU,UGHT,WEVN,VEWQ,INOP,PINO,ZXTR
,BRNY,CLOS,SEKP,TYUI,REOP,MVWH,D
ALK,VBNC,ZXCV,DEKI,AIAI,SUEA,QWO
I,KSDJ,FDSA,JKLO,QWTR,OICN,NOQZ,
HG;A,SLKD,YTOW,QOEI,ERLM,PSTR
1460 DATA A1S2,D3F5,T4Y5,7K86,PO
QW,D3L0,J5K1,0932,D012,PCB4,CR45
,USA0,Z021,MO3D,L0O9,DR13,PR3V,Z
PR6,NHU8,H0DX,XYP3,01CE,NL90,SL0
2,P03C,X09E,MOT5,9371,C0Z3,FH03,
DX34,NL90,HNLZ,ZN37,CDE3,LKN8
1470 DATA DOWNTOWN,EVERYDAY,ANTI
CIPATE,MERIDIAN,MAXIMUM,IMITATE,
ZESTFUL,UNDERSTAND,OVERCOME
1480 DATA MEANINGFUL,XYLOPHONE,S
CHOOLING,PHOTOGRAPH,EXONERATE,IN
TERFACE,COMPUTER,GREATEST,MAGAZI
NE
1490 DATA NOW IS THE TIME FOR AL
L GOOD MEN,EVERY GOOD BOY WILL H
AVE HIS DAY,THERE IS NOTHING STO
PPING ME NOW,ROSES ARE RED-VIOLE
TS ARE VIOLET,MANY A GOOD MAN HA
S GONE ASTRAY,I LOVE TO TYPE WIT
H MY OWN TANDY,THE SLY FOX WILL
GET THE CHICKEN
1500 DATA COMPUTERS ARE NOT ACTU
ALLY SMART,HE LIKES TO WRITE HIS
 OWN STORIES,OSTRICHES ARE VERY
STRANGE BIRDS,PLUTO AND CHARON A
RE FAR DISTANT,DANCING AND SINGI
NG CELEBRATIONS
1510 RETURN
1520 '
1530 '** This CLEARS the MENU an
d WORK Areas
1540 '
1550 PLAY"T10N$=A$(E) OR AN$=B$(
E) THEN HPRINT( 4,77:PRINT TI;:P
LAY"O5C"
1560 E=1:HPUT(8,5)-(268,56),1,PS
ET
1570 HPUT(355,5)-(615,56),1,PSET
1580 HPUT(140,5)-(400,56),1,PSET
1590 RETURN
1600 '
1610 '** The TITLE ROUTINE is he
re
1620 '
1630 PALETTE RGB:WIDTH 40:HSCREE
N 2:HCLS 3
1640 HCOLOR 1:HLINE(50,10)-(280,
30),PSET,BF:HCOLOR 14:HPRINT(9,2
),"The CC-III TYPING TUTOR":HCOL
OR 2:HLINE(52,13)-(278,27),PSET,
B
1650 HCOLOR 14:HLINE(50,120)-(27
0,170),PSET,B:HLINE(52,122)-(268
,168),PSET,B
1660 HPAINT(55,130),4,14:KEY$="U
4R9D4R2U4R9D4R2U4R9D4R2U4R9D4R2U
4R9D4R2"
1670 KEY$=KEY$+KEY$+KEY$:HDRAW"B
M70,160;C14;XKEY$;U4R9D4;"
1680 HDRAW"BM70,153;C14;XKEY$;U4
R9D4;":HDRAW"BM70,146;C14;XKEY$;
U4R9D4;":HDRAW"BM70,139;C14;XKEY
$;U4R9D4;"
1690 HCOLOR 4:HLINE(42,118)-(280
,100),PSET,B:HCOLOR 2:HPAINT(50,
105),2,4
1700 HCOLOR 14:HLINE(32,95)-(41,
125),PSET,BF
1710 HLINE(290,95)-(281,125),PSE
T,BF
1720 HLINE(68,165)-(248,130),PSE
T,B
1730 HDRAW"BM120,129;C14;E8R62F8
"
1740 HCOLOR 4:HLINE(90,112)-(228
,102),PSET,BF
1750 HCOLOR 14:T1$="COCO III":FO
R X=1 TO LEN(T1$):HPRINT(16,13),
LEFT$(T1$,X):PLAY"T32O1CP32E":NE
XT:HCOLOR 4:HLINE(90,102)-(228,9
2),PSET,BF:PLAY"O5EO4EO5P30E":HP
RINT(16,13),T1$
1760 HCOLOR 14:HPRINT(16,12),T1$
1770 T2$="Typing Tutor":FOR X=1
TO LEN(T2$):HPRINT(14,13),LEFT$(
T2$,X):PLAY"T32O1DCP32E":NEXT
1780 HCOLOR 4:HLINE(90,92)-(228,
82),PSET,BF:PLAY"O5EO4EP32O5E":H
PRINT(16,12),T1$:HPRINT(14,13),T
2$:HCOLOR 14:HPRINT(16,11),T1$:H
PRINT(14,12),T2$
1790 T3$="by L. Hyre":FOR X=1 TO
 LEN(T3$):HPRINT(15,13),LEFT$(T3
$,X):PLAY"T32O1DCP32E":NEXT
1800 FOR TM=1 TO 1200:NEXT:RETUR
N
1810 '
1820 '** ON BRK comes here to cl
ean up the act!
1830 '
1840 WIDTH 32:SCREEN 0:CLS:POKE
65496,0:PRINT"NORMAL SPEED RESTO
RED":PRINT"PROGRAM STOPPED":END
```

Making the Dewey Decimal System User-Friendly

By Steve Blyn
Rainbow Contributing Editor

This article will help familiarize students with one important aspect of the library — The Dewey Decimal System. This system is used with non-fiction books only. When students begin to do reports in social studies or science, sometime near the end of their elementary school career, the use of non-fiction material will become essential. Knowing how to utilize what the library has to offer will be of great benefit.

The overwhelming majority of our libraries have numbers and letters marked on the spines of all non-fiction books. Some large libraries use Library of Congress numbers to organize their books. There are also a small number of libraries that use computers to organize and locate their books. Someday, computers may altogether replace the need for numbering systems. When computerized, the books can merely go in alphabetical or any other order and be easily located on a video monitor.

At the moment, however, the overwhelming majority of libraries in our country use the Dewey Decimal System. A man named Melvil Dewey created this system, which arranges all non-fiction books into 10 subject areas. Dewey's system uses a decimal point. This allows the continuous addition of numbers for any new books acquired.

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

Thumbnail Sketch of the Dewey Decimal System

000-099 General Works — Includes many types of reference books including encyclopedias and almanacs.

100-199 Philosophy — Includes different ways of thinking through the ages as well as psychological topics.

200-299 Religion — Includes religions past and present and Bible stories.

300-399 Social Sciences — Includes how people live together, costumes, holidays, etiquette, folk tales and fairy tales.

400-499 Language — Includes various dictionaries of all languages, including English.

500-599 Pure Science — Includes physics, biology, astronomy, chemistry, botany, animals and many other topics from nature.

600-699 Applied Science — Includes ways that science helps us, such as computers, rockets, television, farm animals and pets.

700-799 Fine Arts — Includes art, music, puppets and other amusements.

800-899 Literature — Includes English and American plays and poetry, as well as literature from other countries.

900-999 History and Travel — Includes geography, travel, biographies and histories of ancient and modern times.

This program asks the student in which section of the library can we learn more about various subjects. We hope that the program will make the Dewey Decimal System less frightening and more understandable to students. The system is often quite intimidating to beginners.

Line 50 reads the `DATA` statements for the Dewey Decimal System. Line 90 prints out this information in the form of a chart. This chart is to be referred to by the student throughout the program.

Line 60 reads the `DATA` statements for the questions and answers. Lines 110-130 ask where we can find information about one of the 21 randomly selected questions included in this program. Line 140 asks the student for an answer and lines 160 and 170 tell if the answer was correct or incorrect. The correct answer will be displayed if the student gave an incorrect response.

Twenty-one questions and answers have been included in this program. These are represented by `D$` and `E$`. They are the `DATA` statements in lines 300-360. You may change these `DATA` statements or add more of your own. If you want to add any, be certain to adjust the `DIM` statement in Line 40, the `T` variable in Line 60 and the `R` variable in Line 120.

Line 80 has the counter for this program. After 10 questions, the score is displayed by lines 210-230. The student may at that time press the E key to end the program or the G key to go again.

We hope this program will help familiarize your child or students with the Dewey Decimal System. Although computers may someday truly cancel out the need for this system, that day is quite some time in the future. ☐

The listing: DEWEY

```
10 REM"DEWEY DECIMAL SYSTEM"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987
30 PR$=STRING$(32,255)
40 DIM A$(10),B$(10),C$(10),D$(2
1),E$(21)
50 FOR T=1 TO 10:READ A$(T),B$(T
),C$(T):NEXT T
60 FOR T=1 TO 21:READ D$(T),E$(T
):NEXT T
70 CLS5
80 N=N+1:IF N>10 THEN 210
90 FOR T=1 TO 10:PRINTTAB(0)A$(T
);"."TAB(3)B$(T)TAB(13)C$(T):NEX
T T
100 PRINT@320,PR$;
110 PRINT@352," WHERE CAN WE LE
ARN MORE ABOUT"
120 R=RND(21)
130 PRINT@384,D$(R)
140 PRINT@412,"? ";:LINEINPUT AN
$
150 PRINT@448,PR$;
160 IF AN$=E$(R) THEN PRINT@425,
"CORRECT";:CR=CR+1
170 IF AN$<>E$(R) THEN PRINT@421
,"SORRY,"E$(R)" IS CORRECT";
180 PRINT@484,"press enter to go
 on";
190 EN$=INKEY$
200 IF EN$=CHR$(13) THEN 70 ELSE
 190
210 CLS:PRINT"     DEWEY DECIMAL
SYSTEM"
220 PRINT:PRINT"YOUR SCORE WAS "
CR*10"% THIS TIME."
230 PRINT:PRINT"          PRESS G T
O GO AGAIN            OR E TO EN
D THE GAME."
240 EN$=INKEY$
250 CR=0:N=0
260 IF EN$="G" THEN RUN ELSE IF
EN$="E" THEN END ELSE 240
270 DATA A,000-999,GENERAL WORKS
,B,100-199,PHILOSOPHY,C,200-299,
RELIGION,D,300-399,SOCIAL SCIENC
ES
280 DATA E,400-499,LANGUAGE,F,50
0-599,PURE SCIENCE,G,600-699,APP
LIED SCIENCE,H,700-799,FINE ARTS
290 DATA I,800-899,LITERATURE,J,
900-999,HISTORY AND TRAVEL
300 DATA THE FRENCH LANGUAGE,E,B
ONGO DRUMS,H,THE STORY OF THE U.
S.FLAG,J
310 DATA WAYS OF THINKING,B,ALMA
NACS,A,BIBLE STORIES,C
320 DATA STORIES ABOUT GODDESSES
,C,WASHINGTON'S LIFE STORY,J,TUR
TLES AND TORTISES,F
330 DATA POETRY OF THE 1800'S,I,
SENDING SOMEONE TO THE MOON,G,AT
OMIC ENERGY,G
340 DATA BRAZIL'S HISTORY,J,TORN
ADOES,F,HOW TO MAKE PUPPETS,H
350 DATA HISTORY OF ANCIENT ROME
,J,THE CARE OF PETS,G,CHEMISTRY
EXPERIMENTS,F
360 DATA FAMOUS FAIRY TALES,D,RE
FERENCE BOOKS,A,HISTORY OF TELEV
ISION,G
```

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Five Easy Pieces

The new Color Computer owner buys his/her versatile machine for its graphics and music capabilities, organization of their home and office, educational purposes — both in the home and school and to acquire programming knowledge — and some, simply for pure fun and entertainment.

As far as the CoCo is concerned, the more you learn, the more you realize how little you actually know. That is why every session at the keyboard is an adventure in learning.

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain and help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Contributions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and will be useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we do not have the time to key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

— Jutta Kapfhammer
Submissions Editor

Game

4K

Tricks Of The Trade

By Michael B. Kromeke

Switch is a puzzle-type game that can be solved by moving the four blue blocks on the left to the right side of the screen and the four red blocks on the right to the left side of the screen.

Blocks can only be moved forward one space at a time and only the blocks of opposite color can be jumped over. Blue blocks can only be moved to the right and red blocks only to the left; the program will prevent you from making illegal moves.

If you get stuck and cannot make another move, just press X to start the game again.

The listing: SWITCH

```
10 REM MICHAEL B. KROMEKE
20 DIM A,A$,B,B$,X,P(9):CLS0
30 FOR X=1057 TO 1086:POKE X,140
:POKEX+64,131:POKEX+160,140:POKE
X+288,131:NEXTX
40 PRINT@7," CORRECT SOLUTION ";
:FOR X=0 TO 9 STEP 3:PRINT@68+X,
CHR$(191);:PRINT@83+X,CHR$(175);
:NEXT X
50 FOR X=1056 TO 1120 STEP 32:PO
KE X,143:POKE X+31,143:NEXT X:FO
R X=1216 TO 1344 STEP 32:POKE X,
143:POKE X+31,143:NEXT X
60 B$=CHR$(128):B$=B$+B$
70 PRINT@291,"";:FOR X =1 TO 9:P
RINT X;:NEXT X
80 FOR X=1TO4:P(X)=1:P(X+5)=2:NE
XT X
90 PRINT@390,"PRESS # 1-9 TO MOV
E ";:PRINT@384,CHR$(175);:PRINT@
386,"=> ";:PRINT@411," <=";:PRIN
T@415,CHR$(191);
100 PRINT@459,"PRESS 'X'";:PRINT
@489,"TO TRY AGAIN ";:GOTO260
110 A$=INKEY$:IF A$=""THEN 110
120 IF A$="X" THEN RUN 20
130 A=VAL(A$):IF A<1 OR A>9 THEN
GOTO 250
```

```
140 IF P(A)=1THEN 210
150 IF P(A)=0 THEN 250
160 IF A-1=0 THEN 250
170 IF P(A-1)=0 THEN P(A-1)=P(A)
:P(A)=0:GOTO 260
180 IF A-2=0 THEN 250
190 IF P(A-2)=0 THEN P(A-2)=P(A)
:P(A)=0:GOTO 260
200 GOTO 250
210 IF A+1=10 THEN 250
220 IF P(A+1)=0 THEN P(A+1)=P(A)
:P(A)=0:GOTO 260
230 IF A+2=10 THEN 250
240 IF P(A+2)=0 THEN P(A+2)=P(A)
:P(A)=0:GOTO 260
250 SOUND1,3:GOTO 110
260 PRINT@228,"";:FOR X=1 TO 9
270 IF P(X)=1 THEN PRINT(CHR$(17
5));B$;
280 IF P(X)=0 THEN PRINT B$+CHR$
(128);
290 IF P(X)=2 THEN PRINT CHR$(19
1)B$;
300 NEXT X:SOUND 99,2:SOUND 140,
1:IF B=1 THEN PRINT@170,"CHANGE
places";:B=0:ELSE IF B=0 THEN PR
INT@170,"change PLACES";:B=1
310 FOR X=1TO4:IF P(X)<>2 THEN 1
10 ELSE NEXT
320 IF P(5)<>0 THEN 110
330 FOR X=1 TO 255 STEP 3:SOUNDX
,2:POKE 65314,X:NEXT X
340 CLS3:FOR X=1 TO 20
350 PRINT@RND(500)," YOU DID IT
";:SOUND RND(255),4:NEXT X:END
```

Business Calculations

4K

Payday Pal

By John Gallagher

Have you ever wondered how much an hourly wage increase would affect your daily, weekly, monthly or yearly earnings? By entering either the percentage of the increase or the hourly rate you wish to examine, *Wage Calc* will do just that. (If you only wish to examine the increased wage rate per hour, you must enter 0 to bypass the percentage input.)

The program will also display the difference between your old and new rate of pay in hourly, daily, weekly, monthly and yearly totals. (See Figure 1.)

```
% INCREASE : .03
wage groups current new
   HOURLY : 4.35    4.4805
    DAILY : 34.8    35.844
   WEEKLY : 174     179.22
  MONTHLY : 696     716.88
   YEARLY : 9048      9319.44

        wage rate differences
HOURLY DIFFERENCE  : .1305
DAILY DIFFERENCE   : 1.044
WEEKLY DIFFERENCE  : 5.21999997
MONTHLY DIFFERENCE : 20.8799999
YEARLY DIFFERENCE  : 271.439999
AGAIN ? y/n
```

Figure 1: Sample printout of *Wage Calc*

The listing: WAGECALC

```
1 CLS
2 POKE65495,0
3 INPUT"ENTER AMOUNT OF INCREASE
 IN      DECIMAL FORM : %";A
4 INPUT"ENTER YOUR PRESENT HOURL
Y WAGE  XXX.XX : $";B
5 FOR J = 1 TO 1000:NEXT J
6 CLS
7 PRINT@0,"% INCREASE :"A
8 PRINT@32,"wage groups current
new"
9 PRINT@67,"HOURLY :"B
10 I=B*A : B1=I+B
11 PRINT@83,B1
12 D=B*8 : D1=B1*8
13 PRINT@100,"DAILY :"D
14 PRINT@115,D1
15 C=D*5 : C1=D1*5
16 PRINT@131,"WEEKLY :"C
17 PRINT@147,C1
18 M=C*4 : M1=C1*4
19 PRINT@162,"MONTHLY :"M
20 PRINT@179,M1
21 Y=D*260 : Y1=D1*260
22 PRINT@195,"YEARLY :"Y
23 PRINT@213,Y1
```

```
24 PRINT@264,"wage rate differen
ces"
25 X=B1-B
26 PRINT@288,"HOURLY DIFFERENCE
 :"X
27 S=D1-D
28 PRINT@320,"DAILY DIFFERENCE
 :"S
29 T=C1-C
30 PRINT@352,"WEEKLY DIFFERENCE
 :"T
31 Q=M1-M
32 PRINT@384,"MONTHLY DIFFERENCE
 :"Q
33 K=Y1-Y
34 PRINT@416,"YEARLY DIFFERENCE
 :"K
35 PRINT@448,"AGAIN ? y/n"
36 A$=INKEY$ : IF A$=CHR$(89) TH
EN 1 ELSE 37
37 IF A$=CHR$(78) THEN 38 ELSE 3
6
38 POKE 65494,0:CLS:END
```

4K

It Figures

By Keiran Kenny

Total will add a long list of numbers and then check for accuracy. The length of entries is restricted to nine characters. Up to 216 numbers can be entered; if more are needed, change the value of 216 in lines 70 and 210 to the desired number.

The listing: TOTAL

```
10 CLS:PRINT@40,"<<<TOT-ALL>>>"
20 PRINT@96,"BY KEIRAN KENNY, TH
E HAGUE, 1986"
30 FORX=160TO191:PRINT@X,"+":NEX
T
40 PRINT@224,"INPUT THE NUMBERS
TO BE ADDED    (MAX. 9 CHARACTERS
 INCLUDING     DECIMAL POINT). YO
U WILL HAVE A RUNNING TOTAL AND,
 AFTER EACH    13 ROWS, A SUB-TOT
AL AT THE TOP OF EACH COLUMN. TO
 SUBTRACT      ENTER A MINUS NUMB
ER.";
50 PRINT:PRINT:PRINTTAB(6)"PRESS
 ANY KEY.";:EXEC44539:CLS
60 PRINT:PRINT
70 DIM A(216),SM(216)
80 P=80
90 N=N+1:PRINT@0,CHR$(31):PRINT@
0,;:INPUT"INPUT A NUMBER";A$:A=V
AL(A$):PRINT@0,CHR$(31)
100 IFLEN(STR$(A))>10 THENN=N-1:
GOTO90
110 A(N)=A:SM(N)=SM(N-1)+A(N)
120 LA=LEN(STR$(INT(A(N)))):LS=L
EN(STR$(INT(SM(N)))):LT=LEN(STR$
(INT(SM(N-1))))
130 IFA(N)>0ANDA(N)<1THENLA=1
140 IFSM(N)>0ANDSM(N)<1THENLS=1
150 IFA(N)<0ANDA(N)>-1THENLA=1
160 IFSM(N)<0ANDSM(N)>-1THENLS=1
170 IFSM(N-1)<0ANDSM(N-1)>-1THEN
LT=1
180 IFN/13<>INT(N/13)THENPRINT@P
-16,CHR$(31):PRINT@P-LA,A(N):PRI
NT@P+26-LS,"TOTAL:"SM(N);
190 IFN/13=INT(N/13)THENCLS:PRIN
T@40-LT,"SUB-TOT:"SM(N-1):P=80:P
RINT@P-LA,A(N):PRINT@P+26-LS,"TO
TAL:"SM(N);
200 P=P+32
210 IFN=216THEN230
220 GOTO90
230 PRINT@P+29,"END";
```

Utilities

CoCo3

Tips On The CoCo 3

By Eric White

A few secrets have been discovered regarding the CoCo 3 that are not mentioned in Tandy's Color Computer 3 Extended BASIC manual.

To detect whether the following keys are being pressed, you can use these statements in your programs:

`IF PEEK(341) = 191 THEN`	key ALT is pressed
`IF PEEK(342) = 191 THEN`	key CTRL is pressed
`IF PEEK(343) = 191 THEN`	key F1 is pressed
`IF PEEK(344) = 191 THEN`	key F2 is pressed

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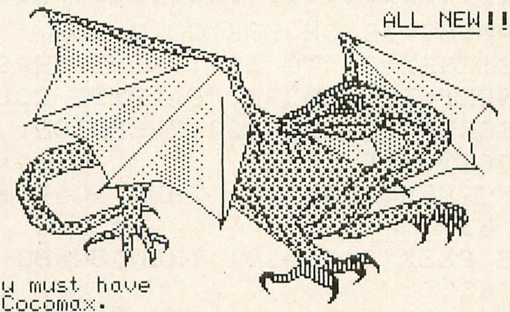

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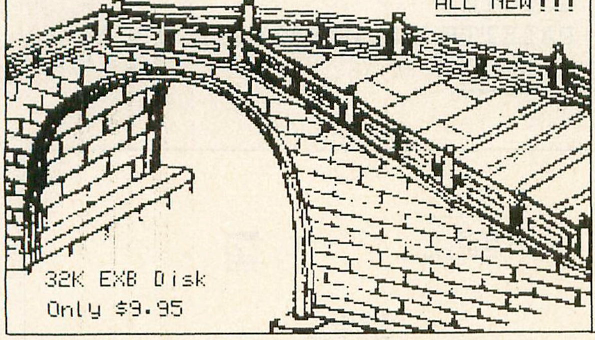

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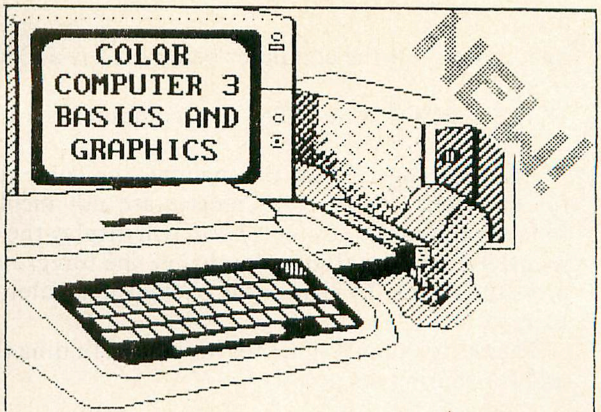
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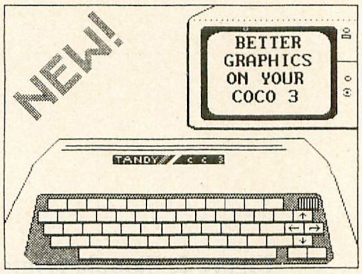
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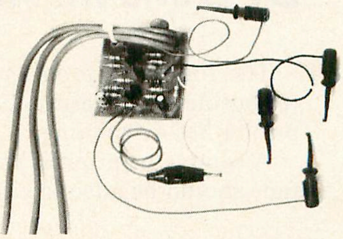

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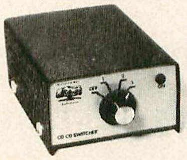
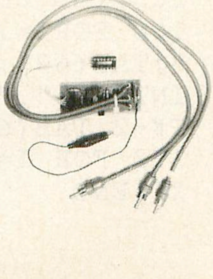


The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

$39.95 plus $2.00 shipping and handling

DOUBLE DRIVER I

The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.



MONO II

Mono II for Color Computer 2. An excellent monochrome monitor driver that has audio output also. Specify model needed.

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Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

and, to detect if the computer being used is a CoCo 3, use:

`IF PEEK(33021)=50 THEN` computer is a CoCo 3

Also, on Page 295 of the manual, the color definitions for the CoCo 3's 64-color palette are not included. The following program, *Color Check*, will display the color and its palette number (0-63). To change the foreground color, press the F1 key. To change the background color, press the F2 key.

Thanks to John Wagner for his help in finding these clues and for sharing his new CoCo 3.

The listing: COLRCHEK

```
10 '*****************************
20 '*   PALETTE COLOR CHECKER   *
30 '* FOR USE WITH THE COCOIII *
40 '*  VERSION:1.0     8611.04  *
50 '*****************************
60 '*   (C) 1986 BY ERIC WHITE  *
70 '*****************************
80 FG=0:BG=18:ON BRK GOTO 150
90 CLS:FORX=32 TO 127:PRINT CHR$
(X);:NEXT:PRINT@390,"PALETTE COL
OR CHECKER":PRINT@422,"VERSION:
1.1  8611.01"
100 IF PEEK(343)=191 THEN FG=FG+
1 AND 63
110 IF PEEK(344)=191 THEN BG=BG+
1 AND 63
120 PALETTE 12,FG:PRINT@230,"F1
 FOR FOREGROUND="FG
130 PALETTE 13,BG:PRINT@294,"F2
 FOR BACKGROUND="BG
140 GOTO100
150 PALETTE 12,0:PALETTE 13,18
```

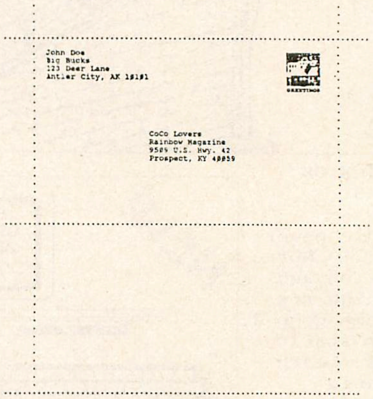
Seal It With A CoCo Kiss

16K
ECB

By David M. Allen

The following program prints self-addressed envelopes for business or pleasure. Be sure to set the baud rate on your printer before running.

A sample printout is shown in Figure 2. A few strips of tape should be adequate to seal the envelope securely.



John Doe
Big Bucks
123 Deer Lane
Antler City, AK 10101

CoCo Lovers
Rainbow Magazine
9509 U.S. Hwy. 42
Prospect, KY 40059

Figure 2: Sample printout of *Envelope*

The listing: ENVELOPE

```
1 REM *** ENVELOP5 ***
2 REM *** DAVID M. ALLEN ***
3 REM *** P. O. BOX 531 ***
4 REM *** BREWSTER, WA. 98812 **
*
10 REM: THIS PROGRAM PRINTS A SE
LF ADDRESSED ENVELOPE
20 CLS:PRINT"SENDER ADDRESS":INP
UT "NAME    ";L1$:INPUT "COMPANY"
;C1$:INPUT "STREET ";L2$:LINEINP
UT "CTY,ST,ZIP ";L3$
30 PRINT "RECEIVER ADDRESS ":INP
UT "NAME     ";L4$:INPUT "COMPANY"
;C2$:INPUT "STREET ";L5$:LINEINP
UT "CTY,ST,ZIP ";L6$
40 FORI=1TO4:PRINT#-2,TAB(6);"."
;TAB(69);".":NEXT:FORI=1TO74:PRI
NT#-2,".";:NEXT:FORI=1TO2:PRINT#
-2,TAB(6);".";TAB(69);".":NEXT
50 PRINT#-2,TAB(6);".";TAB(9);L1
$;TAB(69);"."
60 IF C1$="" THEN GOTO 80
70 PRINT#-2,TAB(6);".";TAB(9);C1
$;TAB(69);"."
80 PRINT#-2,TAB(6);".";TAB(9);L2
$;TAB(69);"."
90 PRINT#-2,TAB(6);".";TAB(9);L3
$;TAB(69);"."
100 FORI=1TO6:PRINT#-2,TAB(6);".
";TAB(69);".":NEXT
110 PRINT #-2,TAB(6);".";TAB(30)
;L4$;TAB(69);"."
120 IF C2$="" THEN GOTO 140
130 PRINT#-2,TAB(6);".";TAB(30);
C2$;TAB(69);"."
140 PRINT#-2,TAB(6);".";TAB(30);
L5$;TAB(69);"."
150 PRINT#-2,TAB(6);".";TAB(30);
L6$;TAB(69);"."
160 FORI=1TO7:PRINT#-2,TAB(6);".
";TAB(69);".":NEXT:FORI=1TO74:PR
INT#-2,".";:NEXT:FORI=1TO21:PRIN
T#-2,TAB(6);".";TAB(69);".":NEXT
170 FOR I=1TO74:PRINT#-2,".";:NE
XT:END
```

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- Easy menu operation

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Hierarchial directory
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- Complete pattern matching

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ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package. **$59.95**

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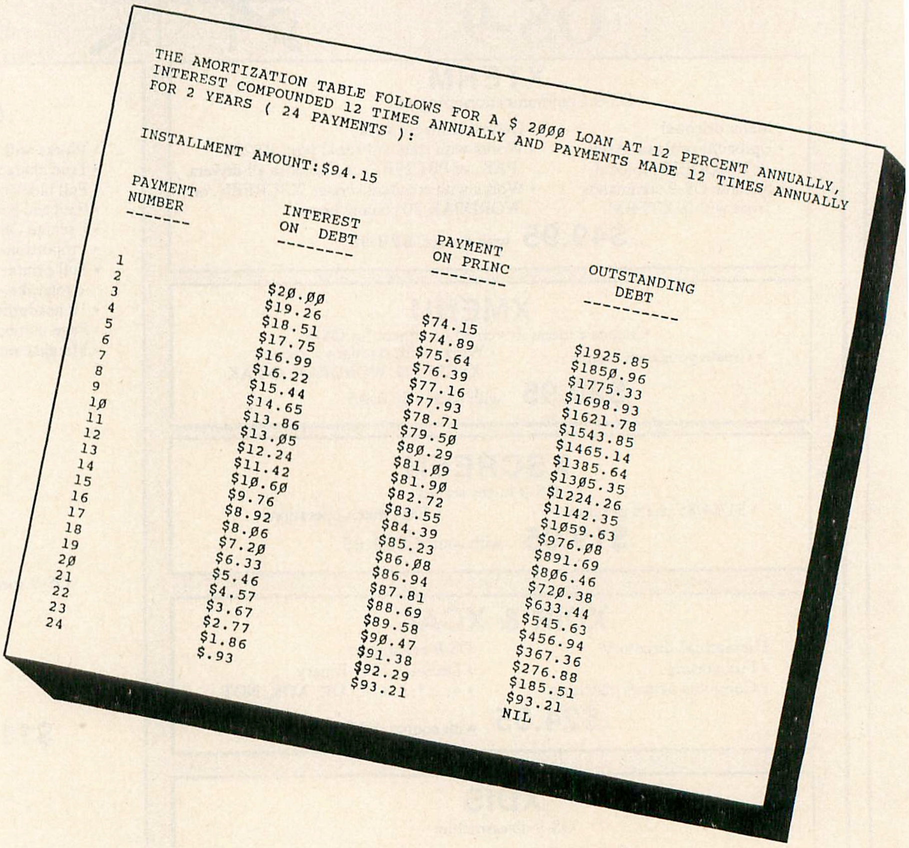
16K
ECB

A MATTER OF PRINCIPAL



```
THE AMORTIZATION TABLE FOLLOWS FOR A $ 2000 LOAN AT 12 PERCENT ANNUALLY,
INTEREST COMPOUNDED 12 TIMES ANNUALLY AND PAYMENTS MADE 12 TIMES ANNUALLY
FOR 2 YEARS ( 24 PAYMENTS ):

INSTALLMENT AMOUNT:$94.15

PAYMENT
NUMBER
-------      INTEREST
             ON  DEBT
             --------      PAYMENT
                           ON PRINC
                           --------      OUTSTANDING
                                            DEBT
                                         -----------
      1
      2
      3     $20.00
      4     $19.26
      5     $18.51
      6     $17.75     $74.15
      7     $16.99     $74.89
      8     $16.22     $75.64     $1925.85
      9     $15.44     $76.39     $1850.96
     10     $14.65     $77.16     $1775.33
     11     $13.86     $77.93     $1698.93
     12     $13.05     $78.71     $1621.78
     13     $12.24     $79.50     $1543.85
     14     $11.42     $80.29     $1465.14
     15     $10.60     $81.09     $1385.64
     16     $9.76      $81.90     $1305.35
     17     $8.92      $82.72     $1224.26
     18     $8.06      $83.55     $1142.35
     19     $7.20      $84.39     $1059.63
     20     $6.33      $85.23     $976.08
     21     $5.46      $86.08     $891.69
     22     $4.57      $86.94     $806.46
     23     $3.67      $87.81     $720.38
     24     $2.77      $88.69     $633.44
            $1.86      $89.58     $545.63
            $.93       $90.47     $456.94
                       $91.38     $367.36
                       $92.29     $276.88
                       $93.21     $185.51
                                  $93.21
                                  NIL
```

By Ralph D. Miller

While in the process of purchasing a home recently, I had various financing schemes to consider. In order to evaluate each properly, I needed an amortization program. As always, CoCo to the rescue!

Amortize is small, residing in only 1,982 bytes of memory. It does require Extended BASIC. The printer baud rate is set in Line 2. If you are using the default baud rate of the CoCo (600), just delete Line 2. Printer codes are found in lines 17, 19, 22 and 43. On my IDS-460 (as well as all other printers I've encountered), `CHR$(13)` is a carriage return, and `CHR$(12)` is a form feed.

Amortize is simple to use. Upon running it, you will be asked for the annual interest rate in percent, number of interest periods annually (if your interest is compounded daily, this would be 365; for interest compounded monthly, enter 12, etc.), number of payments per year, the amount of the loan in dollars, and the term of the loan in years. You need enter digits only, no %, $, etc. are needed.

The program then checks to be sure your printer is online and notifies you if it is not. Upon finding the printer online, *Amortize* prints a header describing the loan and the computed installment amount, then details each payment by the amount of the payment applied to interest, the amount applied to principal, and the amount of debt outstanding. These tables really come in handy when you decide to prepay principal payments in order to save interest. After printing the last payment, *Amortize* goes to the data input prompts to run another table.

A word of caution, which I learned through experience: If you let it be known that you can run amortization tables, you'd better shop around for a good price on a couple of boxes of printer paper.

(Questions about this program may be directed to the author at P.O. Box 13322, Tallahassee, FL 32317; 904-386-3618. Please enclose an SASE for a reply when writing.) ☐

Ralph Miller is a broadcast engineer on the systems staff at John H. Phipps Broadcasting. He lives in Tallahassee, Florida.

The listing: AMORTIZE

```
1 REM (C) 1986 RALPH D. MILLER
2 POKE149,0:POKE150,17
3 CLS
4 PRINT:PRINT"ENTER THE ANNUAL I
NTEREST":INPUT"RATE, IN PERCENT:
 ";JU
5 M=JU/100
6 PRINT:PRINT"ENTER THE NUMBER O
F INTEREST":INPUT"PERIODS PER YE
AR: ";Q
7 PRINT:PRINT"ENTER THE NUMBER O
F PAYMENTS":INPUT"PER YEAR: ";S
8 PRINT:PRINT"ENTER THE LOAN AMO
UNT":INPUT"IN DOLLARS: ";A
9 PRINT:PRINT"ENTER THE PERIOD O
F THE LOAN":INPUT"IN YEARS: ";B
10 D=(1+M/Q)^(Q/S)-1
11 F=((1-(1+D)^(-S*B))^-1)*D*A
12 C1=F:GOSUB52:F$=C1$
13 C1=A:GOSUB52:A$=C1$
14 SP=PEEK(65314)AND1
15 IF SP>0 THEN GOSUB58
16 CLS:PRINT@200,"printing table
"
17 PRINT#-2,"THE AMORTIZATION TA
BLE FOLLOWS FOR A $";A"LOAN AT"J
U"PERCENT ANNUALLY,":PRINT#-2,"I
NTEREST COMPOUNDED"Q"TIMES ANNUA
LLY AND PAYMENTS MADE"S"TIMES AN
NUALLY"CHR$(13)"FOR"B"YEARS ("S*
B"PAYMENTS ): "CHR$(13)CHR$(13)
18 GOSUB62
19 PRINT#-2,"INSTALLMENT AMOUNT:
";F$;CHR$(13)CHR$(13)
20 PRINT#-2,"PAYMENT","INTEREST"
,"PAYMENT","OUTSTANDING"
21 PRINT#-2,"NUMBER","ON  DEBT",
"ON PRINC","   DEBT"
22 PRINT#-2,"-------","--------"
,"--------","----------"CHR$(13)
CHR$(13)
23 DC=A:WY=0
24 FOR Y=(WY+1) TO (WY+10)
25 HM=DC*D
26 C1=HM:GOSUB52:HM$=C1$
27 RT=F-HM
28 C1=RT:GOSUB52:RT$=C1$
29 LF=DC-RT
30 C1=LF:GOSUB52:LF$=C1$
31 GOSUB64
32 C1=Y:GOSUB56:PRINT#-2,C1$,HM$
,RT$,LF$
33 IF LF>=F THEN 45
34 Y=Y+1:HM=LF*D
35 C1=HM:GOSUB52:HM$=C1$
36 RT=LF-HM
37 C1=Y:GOSUB56:PRINT#-2,C1$,
38 C1=HM:GOSUB52:GOSUB69:PRINT#-
2,C1$,
39 C1=LF:GOSUB52:GOSUB69:PRINT#-
2,C1$,
40 PRINT#-2,"NIL"
41 C1=HM+LF:GOSUB52
42 IF F$<>C1$ THEN PRINT#-2,"LAS
T PAY'T: ";C1$
43 PRINT#-2,CHR$(12)CHR$(12)
44 GOTO 3
45 DC=LF
46 NEXT Y
47 IF (S*B)>Y THEN 49
48 GOTO 51
49 WY=WY+10
50 GOTO 24
51 RETURN
52 C2=INT(100*C1+.5)/100
53 C1$="$"+MID$(STR$(C2),2)
54 IF C2=INT(C2) THEN C1$=C1$+".
00"
55 RETURN
56 C1$=MID$(STR$(C1),2)
57 RETURN
58 CLS:PRINT@198,"printer off li
ne"
59 SP=PEEK(65314) AND 1
60 IF SP<>0 THEN 59
61 RETURN
62 JF$=RIGHT$(F$,3):IG$=LEFT$(JF
$,1):IF IG$<>"." THEN F$=F$+"0"
63 RETURN
64 GOSUB69
65 JF$=RIGHT$(HM$,3):IG$=LEFT$(J
F$,1):IF IG$<>"." THEN HM$=HM$+"
0"
66 JF$=RIGHT$(RT$,3):IG$=LEFT$(J
F$,1):IF IG$<>"." THEN RT$=RT$+"
0"
67 JF$=RIGHT$(LF$,3):IG$=LEFT$(J
F$,1):IF IG$<>"." THEN LF$=LF$+"
0"
68 RETURN
69 JF$=RIGHT$(C1$,3):IG$=LEFT$(J
F$,1):IF IG$<>"." THEN C1$=C1$+"
0"
70 RETURN
```

NEW

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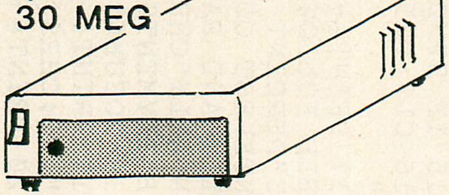

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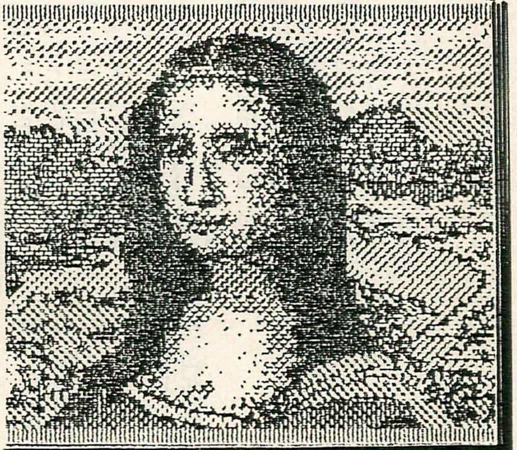

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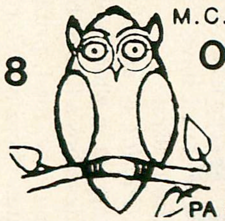

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QUICKLY COPIES SELECTED PROGRAMS FROM DISK. USE WILD CARD OPTION SEARCH TO SELECT GROUPS OF PROGRAMS FOR COPY (NOT FOR PROTECTED PROGRAMS)

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Develop versatile line and bar graphs

Charting the Ups and Downs of Life

By Michael Sims

Originally, I wrote *Graphit* to keep track of my school grades, but I have since adapted it for various uses.

Graphit is an all-purpose graphics program in which you enter values and it develops a line or bar graph. You can then save, load, print out or add more data. There is also room on the graph for a title and labels for the 'X' and 'Y' axes.

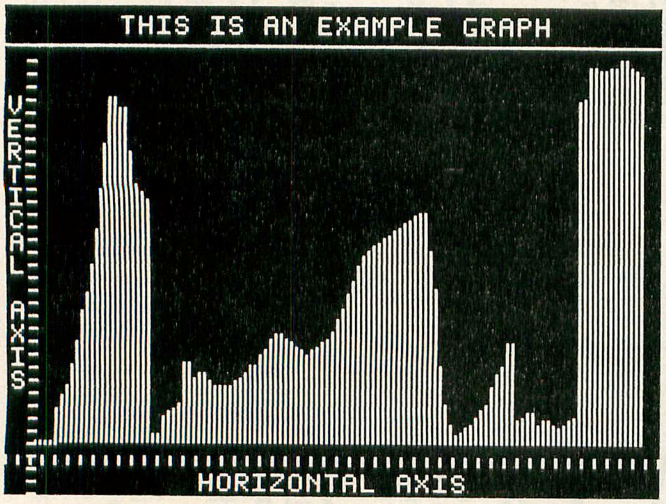
This program is user friendly and menu driven; there shouldn't be any problem with it.

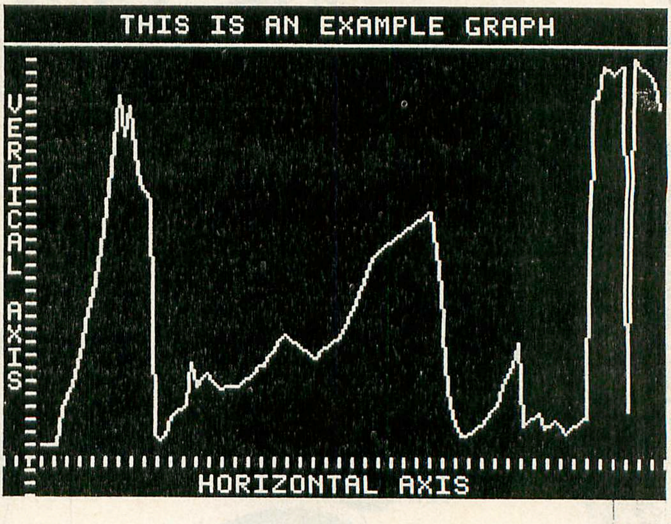
The menu options include:

Add Data — This is where you enter the numbers to be graphed. To leave this mode, press ENTER.
Save Data — Saves data to disk.
Load Data — Loads data from disk.
Graph Data — Makes a line or bar graph from the data provided. If no name is specified for the graph, you are sent back to the menu to pick one at Option 5.
Name Graph — Where you specify name, horizontal and vertical labels.
Print Data — Prints data to printer or screen. Baud rate is set to 1200. To change, edit Line 10000.
New Memory — Clears the memory. I recommend this always be done before loading a new file or starting a new graph.

If there are any questions about this program, don't hesitate to write me at 5 Skinner Court, Tomkins Cove, NY 10986. Please enclose an SASE. ☐

Michael Sims is a junior at North Rickland high school in New York, and is a self-taught programmer and CoCo fanatic. He plans to pursue a career in systems analysis.





140	23
2050	188
4010	185
4160	34
5080	227
7080	198
8000	236
8110	88
END	20

The listing: GRAPHIT

```
0 '         GRAFIT
1 '         =======
2 '      By Michael G. Sims
3 '      5 Skinner Ct.
4 '      Tomkins Cove, NY 10986
5 '
6 GOSUB 10000
10 DIM TEST(255),L$(97):FOR LE=48TO57:L=L+1:READL$(LE):NEXT:FORLE=65TO90:L=L+1:READL$(LE):NEXT
20 RNUM=0
30 IF TIMER<50 THEN 40 ELSE GOSUB8020
40 CLS:PRINT@0,"GRAFIT":PRINT@8,"FN="FILE$:PRINT@20,"NF="RNUM:PRINT@32,STRING$(32,204);
50 PRINT:PRINTTAB(7);"MENU:"
60 PRINTTAB(7);"<1> ADD DATA"
70 PRINTTAB(7);"<2> SAVE DATA"
80 PRINTTAB(7);"<3> LOAD DATA"
90 PRINTTAB(7);"<4> GRAPH DATA"
100 PRINTTAB(7);"<5> NAME GRAPH"
105 PRINTTAB(7);"<6> PRINT DATA"
106 PRINTTAB(7);"<N> NEW MEMORY"
110 A$=INKEY$:IFA$=""THEN110
120 IF A$="N" THEN TIMER=0:RUN
130 A=VAL(A$):IFA<1 OR A>6 THEN GOSUB 6080:FORDL=1TO1000:NEXTDL:GOTO40
140 ON A GOTO 1000,2000,3000,4000,5000,9000
1000 '
1010 CLS:PRINT@0,"ADD DATA":PRINT@32,STRING$(32,204)
1020 FOR X=RNUM+1 TO 255
1030 PRINT"ITEM"X":";:LINEINPUTTEST$
1040 IF TEST$="" THEN RNUM=X-1:GOTO40
1050 IF ASC(TEST$)>57 THEN GOSUB 6070:GOTO1030
1060 IF LEN(TEST$)>9 THEN GOSUB 6020:GOTO 1030
1070 TEST(X)=VAL(TEST$)
1080 IF TEST(X)<0 THEN GOSUB6000:GOTO 1030
1090 NEXT X
1100 GOSUB 6010:GOTO 40
2000 IFRNUM=0THENGOSUB6060:GOTO40 ELSE CLS:PRINT@0,"SAVE DATA":PRINT@32,STRING$(32,204);
2010 PRINT
2020 PRINT"FILENAME:";:LINEINPUTFILE$
2030 IF FILE$="" THEN 40 ELSE IF LEN(FILE$)>8 THEN GOSUB 6040:GOTO2020
2040 OPEN"D",#1,FILE$+"/GPH",33
2050 FOR RUM=1 TO RNUM
2060 PRINT#1,TEST(RUM):PUT#1,RUM
2070 NEXT RUM
2080 PRINT#1,NAME$:PUT#1:PRINT#1,BOT$:PUT#1:PRINT#1,SIDE$:PUT#1
2090 CLOSE#1:GOTO40
3000 CLS:PRINT@0,"LOAD DATA":PRINT@32,STRING$(32,204);
3010 PRINT
3020 PRINT"FILENAME:";:LINEINPUTFILE$
3030 IF FILE$="" THEN 40 ELSE IF LEN(FILE$)>8 THEN GOSUB6040:GOTO2020
3040 OPEN"D",#1,FILE$+"/GPH",33
3050 FOR RNUM=1 TO LOF(1)-3
3060 GET#1:INPUT#1,TEST(RNUM)
3070 NEXT RNUM
3080 GET#1:INPUT#1,NAME$:GET#1:INPUT#1,BOT$:GET#1:INPUT#1,SIDE$
3090 CLOSE#1:GOTO40
4000 POKE178,3:IF RNUM=0 THEN GOSUB 6060:GOTO40 ELSE IF NAME$="" THEN F1=1:GOSUB 6050:GOTO5000
4005 PRINT:PRINT"LINE OR BAR? (L/B)"
4006 A$=INKEY$:IFA$=""THEN4006 ELSE IF A$="L" THEN PRINT ELSE IF A$="B" THEN PRINT ELSE GOSUB 6080:GOTO4006
4010 R5=0:X=0:PMODE4,1:PCLS:SCREEN1,1
4020 X=123-((7*LEN(NA$))/2):FORM=1TOLEN(NA$):X=X+7:DRAW"BM"+STR$(INT(X))+",10;"+L$(ASC(MID$(NA$,M,1))):NEXT
4030 Y=97-((10*LEN(SI$))/2):FORM=1TOLEN(SI$):Y=Y+9:DRAW"BM2,"+STR$(INT(Y))+";"+L$(ASC(MID$(SI$,M,1))):NEXT
4040 X=123-((7*LEN(BO$))/2):FORM=1TOLEN(BO$):X=X+7:DRAW"BM"+STR$(INT(X))+",189;"+L$(ASC(MID$(BO$,M,1))):NEXT
4050 LINE(0,15)-(255,15),PSET
4060 FOR Y=191 TO 20 STEP -5
4070 LINE(9,Y)-(12,Y),PSET
```

```
4080 NEXTY
4090 FORX=0TO255STEP5:LINE(X,179
)-(X,176),PSET:NEXTX
4100 T=0
4110 S=255/RNUM
4120 ZZ=TEST(1):FORZQ=1TORNUM:IF
TEST(ZQ)>ZZ THEN ZZ=TE(ZQ)
4130 NEXT ZQ
4140 N=151/ZZ
4150 LINE(15,171-(TE(1)*N))-(15,
171-(TE(1)*N)),PSET
4155 IF A$="B" THEN POKE178,2
4160 IF A$="L" THEN FOR X=15 TO
255 STEP S ELSE FOR X=15 TO 250
STEP S
4170 R5=R5+1
4175 IF R5=RNUM THEN 4200
4180 IF A$="L" THEN LINE-(X,171-
(TE(R5)*N)),PSET ELSE LINE(X,170
)-(X+(S-5),171-(TE(R5)*N)),PSET,
BF
4190 NEXT X
4200 IFINKEY$=""THEN4200ELSEGOTO
40
5000 CLS:PRINT"NAME GRAPH":PRINT
@32,STRING$(32,204)
5010 PRINT
5020 PRINT"ENTER TITLE OF GRAPH:
"
5030 LINEINPUT">";NAME$
5040 IF NAME$="" THEN NA$=" ":GO
TO40 ELSE IF LEN(NAME$)>32 THEN
GOSUB6040:GOTO5030
5050 PRINT"BOTTOM LABEL:":LINEIN
PUT">";BOT$:IFBOT$=""THENBO$=" "
:GOTO40 ELSE IF LEN(BOT$)>32 THE
NGOSUB6040:GOTO5050
5060 PRINT"SIDE LABEL:":LINEINPU
T">";SIDE$:IFSIDE$=""THENSI$=" "
:GOTO40 ELSE IF LEN(SIDE$)>15 TH
EN GOSUB 6040:GOTO 5060
5070 IF F1=1 THEN F1=0:GOTO4000
ELSE GOTO40
5080 GOTO5080
6000 PRINT"error:NUMBER TOO SMAL
L":SOUND 200,3:RETURN
6010 PRINT"error:FILE TOO LARGE"
:SOUND200,3:FORDL=1TO1000:NEXTDL
:RETURN
6020 PRINT"error:NUMBER TOO LARG
E":SOUND200,3:RETURN
6030 PRINT"error:NAME TOO SHORT"
:SOUND200,3:RETURN
6040 PRINT"error:NAME TOO LONG":
SOUND200,3:RETURN
6050 PRINT"error:NO TITLE":SOUND
200,3:FORDL=1TO1000:NEXTDL:RETUR
N
6060 PRINT"error:MEMORY EMPTY":S
OUND200,3:FORDL=1TO1000:NEXTDL:R
ETURN
6070 PRINT"error:NO ALPHA DATA A
LLOWED":SOUND 200,3:RETURN
6080 PRINT"error:SO SUCH CHOICE"
:SOUND200,3:RETURN
7000 '
7010 DATABRHU4ERFD4GNLBR2
7020 DATAR2U6NGD6R2
7030 DATABU5ER2FDGL2GD2R4
7040 DATABU5ER2FDGNLFDGL2NHBR3
7050 DATABR3U6G3R4BD3
7060 DATABUFR2EU2HL3U2R4BD6
7070 DATABU3R3FDGL2HU4ER2BD6BR
7080 DATABU6R4DG3D2BR3
7090 DATABRHUER2EUHL2GDFR2FDGNL2
BR
7100 DATABRR2EU4HL2GDFR3BD3
7110 DATAU5ER2FD2NL4D3
7120 DATARU6NLR2FDGNL2FDGNL3BR
7130 DATABR4BU5HL2GD4FR2EBD
7140 DATARU6NLR2FD4GNL2BR
7150 DATAU6NR4D3NR3D3R4
7160 DATAU3NR3U3R4BD6
7170 DATABUU4ER3BD4NLD2L3NHR3
7180 DATAU3NU3R4NU3D3
7190 DATAR2U6NL2NR2D6R2
7200 DATABUNUFR2ENU5BD
7210 DATAU3NU3RNE3F3
7220 DATANU6R4
7230 DATAU6F2DUE2D6
7240 DATAU6F4NU4D2
7250 DATABRHU4ER2FD4GNL2BR
7260 DATAU6R3FDGL3D3BR4
7270 DATABRHU4ER2FD4GNL2BUHF2
7280 DATAU6R3FDGL3RF3
7290 DATABUFR2EUHL2HUER2FBD5
7300 DATABU6R4L2D6BR2
7310 DATABUNU5FR2ENU5BD
7320 DATABU6D4F2E2U4BD6
7330 DATANU6E2UDF2NU6
7340 DATAUE4NUG2H2NUF4D
7350 DATABU6DF2E2NUG2D3BR2
7360 DATABU6R4DG4DR4
```

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```
8000 PMODE4,1:PCLS:SCREEN1,1
8010 READA$:X=X+5:DRAW"BM"+STR$(
X)+",120;"+A$:GOTO8010
8020 F5=1:PMODE 4,1:PCLS:SCREEN1
,1:POKE178,2:FORX=0TO20STEP2:LIN
E(X,0)-(X,191),PSET:LINE(256-X,0
)-(256-X,191),PSET:LINE(0,X)-(25
5,X),PSET:LINE(0,191-X)-(255,191
-X),PSET:NEXTX:POKE178,3
8021 G$(1)="BM+1,+0;R4E1UL3;BM-3
,+0;DU4ER4F"
8022 G$(2)="U2R5FDUHEUH2L4D4":G$
(3)="U2R6D2U4H2L2G2D2":G$(4)="U2
R4L4U4R6":G$(5)="R6L3U6R3L6":G$(
6)="BM+3,+0;U6R3L6"
8023 X=90:FORG=1TO6:X=X+10:DRAW"
BM"+STR$(X)+",40;"+G$(G):NEXTG:L
INE(85,47)-(170,27),PSET,B
8030 A$(1)="A GENERAL PURPOSE GR
APH":A$(2)="PROGRAM FOR THE TAND
Y":A$(3)="COLOR COMPUTER":Y=50:A
$(4)=" ":A$(5)=" ":A$(6)="BY":A$
(7)="MICHAEL SIMS"
8040 FOR A=1 TO 7
8050 X=0
8060 X=123-((LEN(A$(A))*7)/2)
8070 Y=Y+15
8080 FOR M=1 TO LEN(A$(A))
8100 X=X+7
8110 DRAW"BM"+STR$(INT(X))+","+S
TR$(Y)+";"+L$(ASC(MID$(A$(A),M,1
)))
8115 PLAY"L255"
8120 NEXT M,A
8140 FOR Z=1TO1300:IFINKEY$=""TH
ENNEXT ELSE 40
8150 GOTO 40
9000 IFRNUM=0THENGOSUB6060:GOTO4
0 ELSE CLS:PRINT"PRINT DATA":PRI
NT@32,STRING$(32,204);
9010 PRINT:PRINT"PRINTER OR SCRE
EN (P/S)"
9020 A$=INKEY$:IFA$=""THEN9020 E
LSE IF A$="P" THEN B=-2 ELSE IF
A$="S" THEN B=0 ELSE IF A$=CHR$(
13) THEN 40 ELSE GOSUB 6080:GOTO
9020
9030 IF B=-2 THEN PRINT"READY PR
INTER & HIT <ENTER>"
9040 IFB=-2 THEN IFINKEY$=CHR$(1
3) THEN 9050 ELSE 9040
9050 PRINT#B,NAME$:PRINT#B,STRIN
G$(LEN(NA$),"-"):FORX=1TORNUM:PR
INTTEST(X),:NEXTX
9060 IF INKEY$=""THEN9060
9070 GOTO 40
10000 POKE150,40'set br to 1200
10010 RETURN
```

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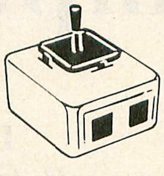

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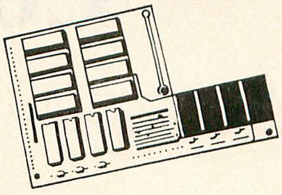

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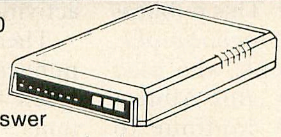

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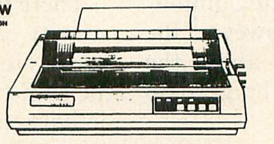

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EDUCATION OVERVIEW

Finding Resources for Computer Learning

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Recently I received a little newsletter in the mail called *Adventures in Learning*. This publication used to be called *DragonSmoke*, and is edited by two people who used to write for the RAINBOW, Bob Albrect and Don Inman. Both continue to produce material and software for the Color Computer.

The newsletter claims to have no carefully and precisely defined audience. It is supposed to be a newsletter for all enthusiasts of the Color Computer. As the name implies, however, the emphasis is on learning — about the Color Computer and about things to do with computers.

The name, by the way, is very apt. The newsletter presents learning as an adventure. I have a personal attachment to dragons, and thus have some feeling of loss for the name *Dragonsmoke*. However, the new name fits the periodical better than the old one.

There are many small (and a few large) classroom activities listed in the newsletter. A creative teacher could easily take material from this newsletter and implement it directly into a lesson. The material is easily adapted to other activities the teacher wants.

There are entire lessons within the publication, as well as pieces on how to teach bits, bytes, and numbering systems: binary, hexadecimal, and decimal. Also, they have a section on simulations for use in schools. The simulations are presented and considered as learning activities, not simply games.

There is a challenging word-learning activity called Wordsworth; each letter gets a number value, and each word is the sum of the values of its letters. This activity can prove difficult even for your brightest students. (Can you find a word whose sum is 30?) There are also book and software reviews, and my favorite, BASIC Challenges (puzzles) for students to solve.

I am not making a self-serving plug for this particular periodical. No commission for subscription will ever come my way. I do, however, think educators should examine a sample copy of the newsletter, but only to determine for themselves if the information is valuable for their individual classrooms. Some teachers will not find the material worthwhile; my guess is that most will find some utility in *Adventures in Learning*.

The major reason for bringing this publication to your attention is that it is the only one I have seen that consists entirely of support materials for educators. The RAINBOW has a lot of good information for teachers: programs; suggestions for class activities; reviews of software and books; and naturally, learning exercises. The RAINBOW is a multi-purpose (perhaps full-purpose is a better term) publication. Contained within these pages is something for everyone with a Color Computer, including the electronic hobbyists, folks running a business, people interested in playing games — everyone. *Adventures in Learning*, on the other hand, is limited to learning-type activities.

It seems to me that educators need support materials. Teachers in classrooms need to have more than just a few places to share information, learn new techniques, and build a file of activities for students. Some teachers get support materials from their local school district through a computer consultant. Some teachers have access to a consortium that provides support materials for classroom experiences with computers. Many teachers, unfortunately, are on their own, or share ideas with just a few close colleagues.

Every teacher has a few good ideas. Even the worst teacher in your school can come up with a good idea for students in classrooms now and then. Most teachers have many good ideas to implement in their classrooms. A very few teachers have a large number of good ideas. It is rare for any teacher, no matter how good, to fill a school year just with self-generated ideas. Teachers, like all other professionals, need to have stimulation from others, and the type of

---

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

support materials contained in the newsletter helps provide this.

One overworked word these days is "network." Despite the overuse of the term, teachers do need a network system (or systems) to learn from each other. The key to a network is sharing. Teachers need to share ideas with each other, and select for use those that fit with their style and classrooms.

A network system should thus involve software development, classroom tips, learning exercises, entire units of instruction, and almost anything else that teachers want to share with each other. The RAINBOW magazine is not structured as a learning network, but does provide some networking capabilities for readers. The RAINBOWfests held around the country are excellent networking devices for teachers as well as for other types of Color Computer users. Something like *Adventures in Learning* is an excellent complement to a network system for educators using computers in classrooms.

Conducting a network system by newsletter is not as satisfying as face-to-face communication, but a newsletter is naturally much better than nothing. The essence of the value of the newsletter, or any networking system, is for teachers to discover what they might try in classrooms. Much of what you discover from any network will have to be filtered through your unique needs and capabilities (those of your students as well as yourself). After that filtering process, you should have a set of new techniques to try in the classroom. Build up enough of these techniques, and you soon find you have an entire set of valuable educational experiences for your classes.

> ***"Build up enough of these techniques, and you soon find you have an entire set of valuable educational experiences for your classes."***

In the ideal situation, teachers will have several networks for idea generation and sharing. In addition to things like newsletters and the RAINBOW, it would be valuable for teachers to have access to resources such as consortia and computer experts within a school. If your situation is less than ideal (whose isn't?), you might want to add one more resource to your list.

For those interested in learning more about the newsletter *Adventures in Learning*, write to P.O. Box 7627, Menlo Park, CA 94062. Perhaps there are other network systems that I haven't heard about. If you know of one, please let me know at 829 Evergreen, Chatham, IL 62629.

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Changes Make Delphi Even Easier to Use

By Cray Augsburg
Rainbow Technical Assistant

The OS-9 SIG, which is reachable from the CoCo SIG menu, was officially opened January 6, 1987. This SIG is designed to meet the needs of the ever-increasing population of OS-9 users. Several people have already stopped in and said hello in the OS-9 Online SIG Forum. Several other changes have also taken place on Delphi. These changes will affect users of both SIGs. First, the `WHO` and `SEND` commands now work across node boundaries, just as they do in Conference. Some of you will remember that, not too long ago, we couldn't even "see" people who were accessing Delphi via a different node. It's good to know that we can easily communicate with these people now. The `WHO` command also shows the number of people in Conference, if anyone, and indicates these people by placing parentheses around their usernames. The `SEND` command has been altered such that it doesn't truncate your message to 128 characters if you make it issue the message prompt by entering just `SEND` or `SEND` *username*. Finally, in addition to being a little quicker to start up, the Conference "head count" is displayed upon entry to the SIG.

In addition to these changes, Delphi has spent considerable time working on specific items in the software which controls the Forum section of the SIG. A new version of the Forum software was installed in late December. At the Forum prompt, entering an `R` brings up

---

Cray Augsburg is RAINBOW's technical assistant and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Ky. His username on Delphi is RAINBOWMAG.

DATABASE REPORT

The big news is the opening of RAINBOW's OS-9 Online Special Interest Group. **Dale Lear, Rick Adams, Greg Law, Don Hutchison, Jim Reed** and I have been working on this project for the last month. We've moved all of the OS-9 files that were formerly lumped together in the one OS-9 Topic Area on the CoCo SIG, and sorted them out in the OS-9 Online database in a more organized fashion. We also expect very soon to start uploading those long-promised five megabytes of OS-9 Users Group material to a special and separate topic area on the OS-9 Online SIG. We have already posted there a complete listing of the files that will soon be arriving.

We welcome all to OS-9 Online. Dale Lear is our SysOp. You can get there either from the CoCo SIG by typing `OS`, or from the Groups menu of Delphi. Note that if you enter OS-9 Online via the CoCo SIG, you will return to the CoCo SIG when you exit it. Note also that the Conference areas of OS-9 Online and of the CoCo SIG are merged, so that anyone in the Conference Area of OS-9 Online can "see" everyone on both the CoCo and the OS-9 Online SIGs if they type `WHO` (or `/WHO` if they are actually in a particular group). You can also conveniently page or send to anyone in either group from Conference of either group.

I want to give special thanks to two of our staff: Don Hutchison, who both helped us set up OS-9 Online directly, and whose tireless work on the CoCo SIG database gave me and others time to work on constructing OS-9 Online. I also want to thank Greg Law, one of our most knowledgeable OS-9 "gurus." Greg has been exceedingly active on the CoCo SIG answering questions about OS-9, and I look forward to seeing him being equally active in his "new home" on OS-9 Online.

Note: If you plan on submitting new OS-9 material to us, please submit it to the OS-9 Online database. Of course, as usual, free time for uploading is available. Just go to the help menu and fill out the form for "request for free upload time." The original CoCo SIG will remain the place for those using Disk Extended BASIC programs, and for most of those with CoCo hardware questions or suggestions. It will continue to support CoCo owners who are not using OS-9, and also provide some OS-9 coverage for a while longer. Those primarily using OS-9 are encouraged to "hang out" at OS-9 Online.

New Submissions

The following new programs are on OS-9 Online: **Duane M. Perkins** (DPERKINS) sent us *TESTASM*, a tutorial file that illustrates use of the MMU in a 128K CoCo 3. His `ACTODC.B09` is an aid to design of DC power supplies. **Kevin Darling** (KDARLING) has submitted an enhanced SCF editor, which upgrades the reply prompt for a reply to the current message. In earlier versions, there was some system confusion between READ and REPLY since both begin with 'R'. There is no need to enter READ since a message number alone will accomplish the same thing. If you want to enter the READ command, you will have to type it out. Also, issuing a REPLY, or R, after an attempt at FOLLOW fails will no longer send a reply to some other message. Using NEXT after you start following a thread interrupts the FOLLOW. Use ENTER to continue following. A NEXT will cause you to read the next unread message whether it is in the thread or not.

How about following a thread backwards? You can do this by entering BACK when you wish to see previous messages in the thread. Just as with FOLLOW, use ENTER to see the next previous message. A NEXT will abort the process and take you to the next unread message. Please note that the FOLLOW command is disabled while reading backwards since it could cause the system to go awry.

Another new feature of our Forum software is TAG (you can abbreviate this command by entering T). This command causes Forum to remember a message you may want to reread again before leaving Forum. This is handy if you want to read all the messages in the Forum before replying to any of them. If you try to exit the Forum without rereading your tagged message, you will be prompted to READ TAG. Rereading a tagged message untags it, but DIR TAG does not.

The HIGH command has been altered so that you can change your current high message without having to see the secondary prompt. Just enter HIGH *xxxx*, where *xxxx* is the message number you want as your highest message. You can also use HIGH 0. The HIGH command normally clears which new messages you have read, but if you press ENTER at the prompt for a new high message number, the Forum software assumes you just wanted to see your current high message number. It does not forget which new messages you have already read. Along with these changes in Forum, the new software has been designed to be much more lenient about what punctuation is allowed in commands involving ranges of message numbers. For instance, each of the following command lines performs the same task:

```
DIR 123:150
DIR 123,150
DIR 123-150
DIR 123;150
DIR 123/150
```

You can also enter something like READ #500 instead of READ 500. If you want to read a range of messages nonstop, you can accomplish this by entering READ 123:150 NS. Before, you had to enter the NS before the range numbers. Please note that some other commands are still sensitive to order. One example of this is REPLY 150 / EDIT.

The /EDIT must be after the message number. In any event, these changes should make life a little easier for those people who are used to other systems and bulletin board systems.

Last is a change which allows you to type ahead one command when entering Forum. For instance, at the CoCo SIG or OS9 prompt, you could enter FORUM READ NEW to enter Forum and read your new messages. □

the simple command line editor of OS-9. **Jay Truesdale** (JAYTRUESDALE) has given us a very simple database utility written in 6809 assembly for compactness and speed. **Vincent Figundio** (VINFIG) has sent us SAD.REB, a text rebuttal to a member's account of his problems getting OS-9 running. **Roger Smith** (SMUDGER) has sent us UNLOAD.B09, a utility that unlinks modules loaded into memory more than once. It saves typing UNLINK over and over.

MikeyTerm 4.3

Just in case you Disk Extended BASIC users thought we had forgotten you, I have a major new announcement: *MikeyTerm* 4.3 is now released and is available in the Data Communications section of the CoCo SIG. This revision of the classic terminal program by **Mike Ward** (MIKEWARD)includes support for the CoCo 3 in 80-column mode. The full program, accessory files and documentation are available in the Data Communications section. Now CoCo 3 users have a choice in 80-column Disk Extended BASIC freeware programs: the new *MikeyTerm* 4.3 or *Greg-E-Term* (the latter was announced last month).

Both are in our Data Communications topic area, and I recommend you download *both* of them. I want to give special thanks to Mike Ward for sharing with our membership on Delphi his latest revision of what is by far the most famous CoCo terminal emulator program.

Another highlight of this past month on the CoCo SIG was the uploading of three new graphics image converter programs. **Erik Gavriluk** (ERIKGAV) has provided a Commodore 64-to-CoCo 3 picture converter.

Inspired by an earlier and cruder project for the CoCo 2 that he and I had worked on together, Erik has written an all-machine language utility that can now display Commodore 64 pictures on a CoCo 3 screen, preserving their full original colors and displaying the entire picture on the screen without need of scrolling. Erik has also written and uploaded a Macintosh picture converter for the CoCo 3, allowing Macintosh pictures to be viewed on the CoCo 3's screen. His partner, **Greg Miller** (GREGMILLER), has uploaded a CoCo 3 converter program for uncompressed Atari ST *Degas* format pictures.

All three of these converter programs are to be found in the Graphics topic area, along with some sample images from these three "alien" machines. The group names to look for are C64PIX.BIN, *Macintosh Pix Converter*, and *Atari ST Converter*.

Erik has also uploaded some alternative printer dump routines for both his CoCo 2 and CoCo 3 Macintosh converter programs. The potential for cross-pollination of artistic ideas due to the availability of such converters is immense. I even heard a rumor that more impressive graphics programs are on the way from these two talented CoCo programmers, who may soon be releasing their first major commercial product.

NOTE: Uploaders and downloaders should please remember that from now on all files in the database that support the CoCo 3 will be flagged in two ways. They will have the expression "(C3)" in the group name title, and will all have as one of their key words "C3." This will hopefully aid CoCo 3 owners who are searching the database for new material for their machines.

I also want to call special attention to an important new contribution from **Greg Geary** (GJG). This is a group called PMODE to HIRES Converter. This machine language utility converts PMODE 4 old-style CoCo graphics screens into CoCo 3 HSCREEN 2 images, an extremely useful trick! **John Snyder** (MYTHRANDIR) has added a sort of BASIC Driver as a "front end" to Greg's utility, to make it even easier to use. John's contribution is listed as HCOPY.

Michael Fischer (MIKE88), (the winner of our "who will bag Forum msg # 20,000 contest) has sent us a stunning CoCo 3 graphics demo called *Bouncing Ball*. There have been many such Amiga-like bouncing ball demos for the Coco 3, but this one sent to us by Mike is by far the most precise rendition of the Amiga graphics demo classic. The version we currently have posted has benefitted from two modifications of the original upload, and now works properly on both 128K and 512K CoCo 3s, and supports either a composite video or an RGB color monitor.

Also in the Graphics database we have had a great number of new files. **Tom Rawlinson** (TOMINO) has sent us a graphics demo, and **Carmen Izzi Jr.** (CIZZIJR) has provided a palette display. Both are for the CoCo 3. **Raymond Lueders** (MOONSHINE) has sent us quite a lot of material, including dreamgirl pictures, pix of Bruce Lee and Karen Allen, and several stunning nudes.

Don Hutchison (the backbone of our database submissions processing on the CoCo SIG) has contributed a digitized picture of Mike Ward. **Billy Hambric** (SNOOPYDOG) has sent us a Snoopy Dog Calendar. **Derrik Kardos** (DTG) has provided a James Bond image.

Ira Goldwyn (IRAG) has sent us more digitized images, including one of Joan Rivers. **Bob Montowski** (GRAPHICSPUB) has sent a viewer utility for looking at Hi-Res DS-69 images. Greg Geary has provided a DMP-220 screen dump for the CoCo 3 Hi-Res screen. **Fred McDonald** (FREDMCD) has sent us `Viper.Pix`. Last but not least, **Michael Schneider** (MSCHNEIDER) has sent us a very intriguing BASIC version of a bouncing ball demo `BOUNCE2.BAS` for the CoCo 3, which shows the impressive power of the CoCo 3's BASIC graphics commands.

In the Music database **Robert Heil** (LURKER) has sent us two new compositions, and **Ray Wright** (RAYWRI) has uploaded over 16 new tunes, including both classical and popular material. Ray has been one of our most prolific music uploaders. Mike Fischer has sent us a version of "Ghostbusters." All of these are in the *Musica II* `PLAY` format.

In the Utility database, **Keith Smith** (UGLY) has provided a CoCo 3 joystick utility. **Ted Christensen** (TEDCHRISTEN) has sent us a budget utility, **David Wendt** (DWENDT) has sent us a disk file comparison utility, and Don Hutchison has provided a tape inventory program. **Chris W. Brown** (CRISPWILLIAM) has sent us a patch for *TelePatch* to allow it to run on the CoCo 3, and we have a budget program from **Jim Manning** (JIMBM). Roger Smith has uploaded a file that may help make some versions of *VIP Writer* run on the CoCo 3.

In the Games topic area, **Steve Macri** (DRACMAN) has sent us *Kelly Checkers*. **Loren Howell** (XENOS) has sent us *Proto 7*. Don Hutchison has provided a version of *The Game of Life* that had previously disappeared from our database. Don has also sent us two other files, *Astro Mines* and the famous *Ultimate Adventure* game. I am sure Adventure game folks will find that last one quite amusing. **David Ferreira** (SKEEVE) has sent us a `BIO.BAS`, and Fred McDonald has provided *Thunder Cat Game*.

In the General topic area, Carmen Izzi Jr. has sent information on disk error codes to aid CoCo 2 and 3 programmers. I've also uploaded a couple of articles I wrote, including some thoughts on the 512K upgrade for the CoCo 3 and some observations of mistakes made in RAINBOW articles.

The Product Review topic area now contains a comparative review I wrote after evaluating both the PBJ 512K memory upgrade and a prototype of the Disto CRC 512K memory upgrade for the CoCo 3.

As you can see, there is a lot of new material in the Delphi RAINBOW CoCo SIG database well worth downloading. And we now have another entire special interest group, OS-9 Online, to serve CoCo and other OS-9 6809 machine users (we even plan on some degree of support for 68000 OS-9). Do drop by and check all of this out! See you on the CoCo SIG and on OS-9 Online.

— Marty Goodman
Rainbow's Delphi Database Manager

From the Princeton RAINBOWfest . . .

The CoCo 3 Round-Table Tape!

THE RAINBOW recorded the main event of RAINBOWfest Princeton, the Saturday evening (Oct. 18) round-table discussion:

"The Design, Development and Marketing of the CoCo 3."

Speakers included Tandy's Barry Thompson and Mark Siegel, as well as independent CoCo 3 programmers Steve Bjork and Dale Lear (filling in for Greg Zumwalt).

This was a lively and informative session and, therefore, we want as many people as possible to hear what these RAINBOWfest guests had to say.

YES, Please send me _______ copies of the "CoCo 3 Round-Table Tape" at $5 per copy plus $1.50 S/H for a total of _______.
(U.S. Currency *only*, please.)

Name (please print) ____________________
Address ____________________
City ____________________ State ________
Telephone ____________________ ZIP ________
Company ____________________
☐ Payment Enclosed, or Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number ____________________
Exp. Date ____________________
Signature ____________________

Make checks payable to The Rainbow. Mail to CoCo 3 Round-Table Tape, The Rainbow, P.O. Box 385, Prospect, KY 40059. To place credit card orders, call our toll-free number: (800) 847-0309.

DELPHI™

This abbreviated, modified version of Delphi's command card has been created to help our readers who use Tandy® Color Computers get started quickly on Rainbow's new COCO SIG. It is being reproduced here for your convenience and can be removed, if you wish, and kept near your computer for easy reference.

WELCOME TO DELPHI

Most Delphi commands are self-explanatory. This card will serve as a handy backup reference.

In the following command reference, use ENTER in place of RETURN.

Signing onto Delphi Directly

1. Dial 617-576-0862.
2. When you have carrier, press RETURN once or twice.
3. At USERNAME type your membername and press RETURN.
4. At PASSWORD type your password and press RETURN.

How To Sign On Using Telenet

1. Dial your local Telenet number.
2. Press RETURN twice.
3. When TERMINAL= appears, press RETURN.
4. When @ appears, type C DELPHI and press RETURN.
5. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using Tymnet

1. Dial your local Tymnet number.
2. When PLEASE TYPE YOUR TERMINAL IDENTIFIER or a string of x's appears, type A without a RETURN.
3. When PLEASE LOG IN appears, type DELPHI and press RETURN.
4. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using DataPac (Canada)

1. Dial your local DataPac number.
2. Type . for 300 bps or .. for 1200 bps and press RETURN.
3. Type PROF 1 and press RETURN to permit use of Xmodem.
4. Type SET 2:1 and press RETURN to allow echo of next command.
5. Type P 1 3106,DELPHI and press RETURN to use Tymnet.
6. Or type P 1 311061703088 and press RETURN to use Telenet.
7. Then type your USERNAME and PASSWORD as outlined above.

Your computer has a key marked either RETURN, NEW LINE, XMIT or ENTER. When you see the word RETURN here, press the corresponding key.

You can obtain your local access number by calling Telenet at 1-800-336-0437 or Tymnet at 1-800-336-0149. If you have any difficulty, call DELPHI toll-free at 1-800-544-4005 (in Massachusetts, 1-617-491-3393).

MAIN MENU OF DELPHI

Starting point for getting the most out of DELPHI.

BUSINESS & FINANCE – Financial and business news and analysis, brokerages services, stock and commodities quotations and more.
CONFERENCE – Real time communication with one person or a group.
DELPHI MAIL – Electronic mail, Batch Mailthru and Telex to users of other online services.
ENTERTAINMENT – Games, trivia, polls, horoscopes, Collaborative Novel and more.
GROUPS & CLUBS – Online meeting places – both clubhouse and clearing-house – for people with personal computers, hobbies and other special interests in common.
HELP – Explanation of Main Menu commands and other features of DELPHI.
LIBRARY – Healthnet, Online Gourmet, CAIN, encyclopedia and other business and consumer databases.
MAGAZINES & BOOKS – Talk back to your favorite publications and subscribe.
MERCHANTS' ROW – Interactive shopping service.
NEWS-WEATHER-SPORTS – Continually updated news and sports, weather forecasts, movie reviews, etc.
PEOPLE ON DELPHI – Member directory and Chatter Board.
TRAVEL – Plan your trip and make reservations.
WORKSPACE – Create, edit, upload and download files.
USING DELPHI – Rates and other information about DELPHI and your use of DELPHI.

DELPHI MAIL

Primary Mail Menu:

BATCH MAILTHRU – Send electronic mail to users of other online services.*
CATALOG – List your Mail files.
GLOBALINK TRANSLATION – A professional translation service.*
MAIL – DELPHI's electronic mail; receive and send messages.
TELEX – Send messages via Western Union's Telex.*
WORKSPACE – Create, edit, upload, download and maintain files of text.
SETMAIL – Set your Mail message counter.

Use these commands for DELPHI Mail:

RETURN – Press RETURN upon entering Mail to read new messages, if any. Pressing RETURN then presents the subsequent message or more of the current message.
BACK – Display message that precedes that currently displayed.
DELETE – Delete just-read message. Or follow DELETE with a number to designate the number of the message you wish to delete.
DIRECTORY – List summary of your Mail messages.
DIRECTORY `folder name` – List summary of messages in specified folder.
DIR/FOLDER – Display all folders in your mail box.
DIR/NEW – List your new messages.
DIR/SINCE= `4-JUL-86` – List messages received since specified date.
EXIT – Return to previous menu.
EXTRACT `filename` – Save displayed message in specified file.
FILE `folder name` – Add displayed message to specified folder.
FORWARD `username` – Send displayed message to others.
NEXT – Display subsequent message (same as pressing RETURN).
READ – Display your Mail messages.
READ/NEW – Display newly arrived Mail.
REPLY – Send instant response to sender of displayed message.
SEARCH `string` – Search Mail file for specified character string.
SELECT – Pick messages for deletion, extracting or searching.
SELECT `folder name` – Choose folder that contains desired messages.
SEND – Transmit message.
SEND `filename` – Send specified file.
SEND/EDIT – Call editor to edit a new message.
SEND/LAST – Send just-sent message to someone else.

GROUPS AND CLUBS

Program libraries, discussions, conferences, newsletters and polls for users of Atari, Apple, Commodore, Texas Instruments, Tandy, Wang and IBM-compatible computers as well as for those interested in science fiction, theology, computer art, music, model building and more.

Entering a group for the first time gives you its nonmember menu and lets you JOIN the group as a member. If you select the JOIN option, you are asked to provide your real name, rather than your DELPHI membername, and to agree to the group's rules. There is no extra cost to becoming a group member.

Use commands for Conference and Workspace when using those functions in Groups and Clubs.

Database

Programs and other files organized into groups of related items.

DIRECTORY – Display a directory of all groups in the topic.
READ – Read description of a group. You must read the description before downloading the file(s) contained in the group.
SEARCH – Search a topic by keyword.
SET TOPIC – Switch from one topic to another without leaving the database section.
SUBMIT – Submit one or more files for inclusion in a topic. You upload file(s) to your workspace and then use the SUBMIT command to send them to the group manager for inclusion in the database.
WORKSPACE – Enter your workspace area.

To access a file, first READ it. Then use these commands:

DESCRIPTION – Display description of file again.
DISPLAY – Display/list the file on your screen.
DOWNLOAD – Use with buffer-capture downloading method.
LIST – Like display, list a file unformatted.
NEXT – Advance to next group or file. Pressing ENTER or RETURN does the same thing.
XMODEM – Download file using Xmodem protocol.
KERMIT – Download file using Kermit protocol. Downloading commands that apply to one file of a multiple group require specifying the number of the file within the group.

Forum

Leave a message or read a message left by another.

ADD – Start new message thread with a different subject and categorize it according to Topics established by group manager. Type ? to see designated Topics.
DELETE – Remove a message written by you or addressed to you.

DIRECTORY – Display directory of messages.
EDIT – Edit current message written by you.
FILE – Place copy of message in your workspace.
FOLLOW – Follow message thread. Read only those messages of designated thread.
FORWARD – Send copy of message via DELPHI Mail.
HIGH – Set/show high message number.

MAIL – Enter DELPHI Mail while keeping your place in Forum.
MENU – Show complete menu of commands.
NEXT – Read next message. Pressing ENTER or RETURN does the same thing.
READ – Read message (follow READ with message number to display designated message).
READ WAITING – Read messages only to you.
READ NEW – Read all new messages.
READ NEW NS – Read messages nonstop (use with computer buffer on).
READ NS 2000 – Read nonstop all messages with numbers greater than 2000.
REPLY – Respond to message.
RETURN – Read next message in thread (used after FOLLOW) or read next new message.
TOPIC – Set/show message topic.

CONFERENCE

'Talk' online with other DELPHI members.

Use these commands before joining a group::

EXIT – Return to previous menu.
JOIN `groupname` – Join existing group or start new one.
NAME `name` – Change your name or 'handle.'
PAGE `membername` – Page another DELPHI member to join you in Conference.
WHO – List members online and Conference groups.

Immediate Commands to use while in Conference

/CANCEL – Terminate a page to another member.
/EXIT – Leave a group.
/GNAME `name` – Change group name.
/JOIN `groupname` – Join an existing group.
/MAIL – Enter Mail, but retain your place in Conference.
/NAME – Change your name or 'handle.'
/PAGE – Invite another member into your group.
/REJECT – A pleasant 'No, thank you' to a pager.
/REPEAT – Control viewing of your own Conference comments.
/SEND `membername` – Send private message to another member.
/SQUELCH `membername` – Ignore messages from a member.
/WHO – List all current members and Conference groups.
/WHOIS `membername` – Display profile.

PEOPLE ON DELPHI

Enter information about yourself; find out about others.

I-AM – Add, change information about yourself.
ADD – Add information about yourself.
CHANGE – Alter your existing profile.
DELETE – Remove all or part of your profile.
DISPLAY – Show your profile.
WHO-IS `membername` – Display profile, if available.
LIST-KEYWORDS – Display keywords used in profiles.
BROWSE – Read member profiles.

SEARCH – Search for certain information, using keywords.
CHATTER BOARD – Bulletin Board for general messages.

Chatter Board menu:

ADD – Post a message on the Chatter Board.
READ – Read posted messages.
HELP – Explanation of Chatter Board commands.

WORKSPACE

You store files and messages here. Upload a file here before submitting it to a database, file forum messages for later retrieval and store mail messages.

CATALOG – Show those files you have created.
CREATE – Create text file and store in your workspace.
DELETE – Remove file you no longer need.
DIRECTORY – Same as Catalog, show the files you have created.
DOWNLOAD – Download text file from DELPHI to disk.
EDIT – Create and edit your own text files.
LIST – List contents of any text file in your workspace.
PURGE – Delete all but current version of duplicate files.
RENAME – Change name of any file in your workspace.
UPLOAD – Upload text file to DELPHI from your computer.
XDOWNLOAD – Download text or non-text file via Xmodem protocol.
XUPLOAD – Upload text or non-text file via Xmodem protocol.
KDOWNLOAD – Download text or non-text file via Kermit protocol.
KUPLOAD – Upload text or non-text file via Kermit protocol.

USING DELPHI

Your source for information about DELPHI.

ADVICE FROM DELPHI – Replies to frequently asked questions.
CREDIT POLICY – Explanation of policy.
DELPHI ADVANTAGE – Explanation of special membership plan and application for membership in plan.
FEEDBACK – Send ideas to DELPHI Product Development Group.
GUIDED TOUR – Brief version of tour you took at sign-on.
INDEX – Quickly locate information on DELPHI.
MAIL TO SERVICE – Send your comments, questions to DELPHI.
MANUALS – Information for obtaining DELPHI and Dialog documentation.
MEMBER SERVICES – Hours for DELPHI Member Services.
MEMBERSHIP AGREEMENT – Your contract for using DELPHI.
NETWORK INFO – Phone numbers and log-on procedures for Tymnet, Telenet and DataPac.
PREMIUM SERVICES – Rates, information on extra-cost services.
WHAT'S NEW ON DELPHI – Online newsletter.
RATES AND PRICES – Line-time rates, with a comparison to DELPHI Advantage rates.
TELEX CODES – Needed to send Telex messages.
REVIEW BILLS/INVOICES – View your DELPHI account.
USAGE HISTORY – View to-date DELPHI activities.
SETTINGS (PROFILE) – Using the following options, tailor response of DELPHI to your unique requirements.

Select from the Settings Menu to alter your interaction with DELPHI. Most settings also may be changed at any time with the appropriate 'slash' (/) command. Type /HELP FULL for a complete list.

BUSY-Mode – Turn off or turn on pages from Conference or alerts to new Mail messages.
DEFAULT-Menu – Bypass the Main Menu by choosing the menu you wish to greet you at sign-on.
DOWNLOAD-Line-Terminator – Adjust text-line termination to your computer type.
ECHO-Mode – Control how characters are 'echoed' to you as you type.
EDITOR – Select the editor you need for Workspace or Mail.
KERMIT-SETTINGS – Change options affecting the way you do Kermit file transfers.
LENGTH (Lines/page) – Adapt DELPHI output to your computer screen's length.
NETWORK-PARAMETERS – Select settings to suit your terminal configuration and establish solid communication with your terminal software.
PASSWORD (Change) – Guard your password by changing it from time to time or if you feel its confidentiality may have been compromised.
PROMPT-Mode – Select the prompt level that suits you: BRIEF provides only a keyword, VERBOSE gives you a keyword and a prompt message, MENU provides all your options at that level.
SLASH-Term-settings – Specify terminal settings to be maintained each time you log on to DELPHI.
TERMINAL-Type – Indicate type of terminal you operate.
TIMEOUT – Indicate number of minutes DELPHI awaits your input before logging you off.
UTILITIES – Advanced operations on your profile settings.
WIDTH (Columns) – Adjust DELPHI output to the width of your computer screen.
XMODEM-SETTINGS – Alter the way DELPHI executes Xmodem file transfers.

DELPHI TERMINAL CONFIGURATION GUIDE

8-bit ASCII, 1 stop bit, no parity, asynchronous, full-duplex, no auto-linefeed, XON-XOFF, or handshaking, enabled.

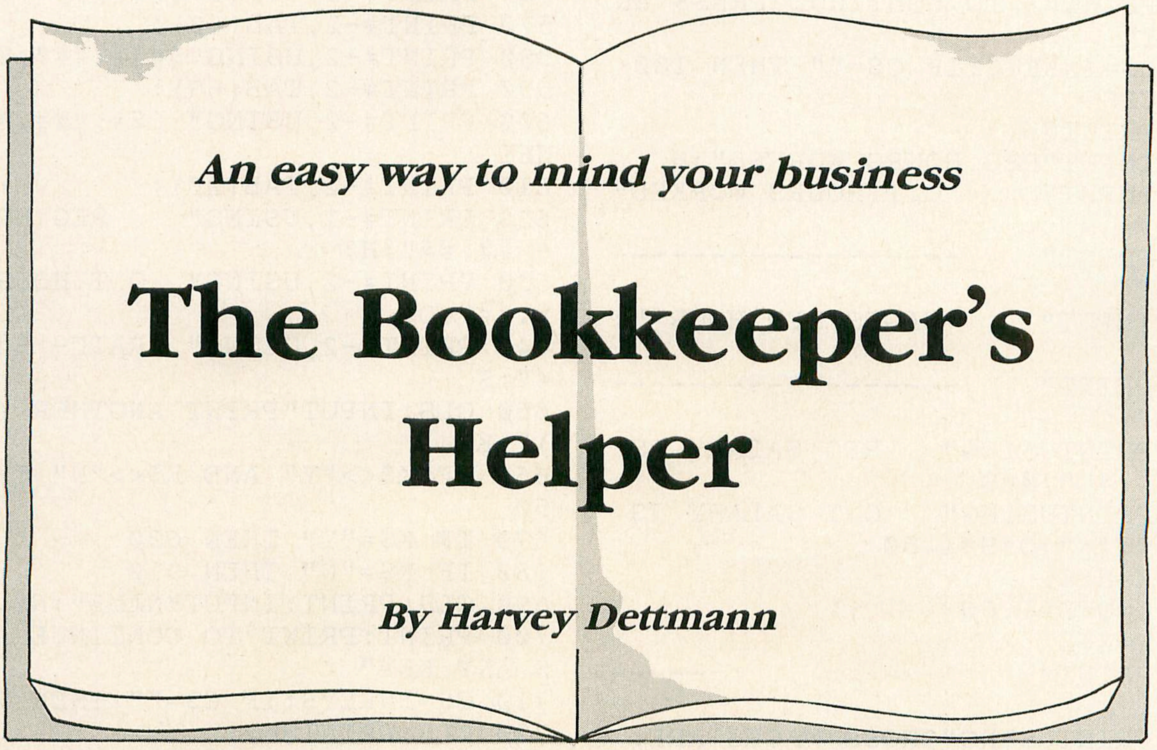
DELPHI CONTROL CHARACTERS

Control-Z – End input or exit to previous menu.
Control-S – Suspend sending.
Control-Q – Resume sending.
Control-O – Skip to end of file or message.
Control-U – Cancel input for current line.
Control-R – Redisplay current line.
Control-X – Cancel everything typed ahead but unsent.
Control-C – Cancel current activity and start over.

Modified Command Card for Rainbow Readers

DELPHI™

Delphi is a © trademark of General Videotex Corporation.
RAINBOW is a © trademark of Falsoft, Inc.
Tandy is a © trademark of Tandy Corporation.
Tymnet is a © trademark of Tymshare, Inc.
Telenet is a © trademark of Telenet Communications Corp.



An easy way to mind your business

The Bookkeeper's Helper

By Harvey Dettmann

The following program will be beneficial to the bookkeepers of small businesses. *Payroll* figures the gross and net amounts on weekly employee checks based on the number of regular and overtime hours worked, the hourly wage, and F.I.C.A., state and federal tax deductions. These deductions can be obtained from the tables supplied by your state and federal government.

Payroll will print to the screen or an LP VII or compatible printer. It can also be used to confirm the accuracy of your own payroll check. ☐

Harvey Dettmann, a retired senior citizen on disability, has enjoyed the Color Computer for three and a half years. He says it has given his life a new direction.

Sample printout

```
DATE: JAN.09,1987

==========================================================================
       NAME                 GROSS          SS/WH       FED/WH    ST/WH    NET WAGES

  JOE X. AMPLE          $  169.69      $  6.28      $ 10.94  $  3.14   $  149.33
                        REG HOURS- 40.00  O T HOURS  3.50  RATE- $ 3.75
```

The listing: PAYROLL

```
10 ' SALARY (SCREEN OR PRINTER)
20 ' *******************
30 ' * HARVEY DETTMANN *
40 ' *  SILVERLEAF DR  *
50 ' *   SUSSEX,WIS.   *
60 ' *      53089      *
70 ' *******************
80 '      VERSION 2.0
90 CLS
100 PRINT@108,"SALARIES"
110 PRINT:PRINT"          BY HARVEY
 DETTMANN"
120 PRINT:PRINT
130 LINEINPUT"  MMM.DD,YYYY
                  ";D$
140 PRINT
```

```
150 INPUT"  NAME";N$
160 PRINT:PRINT
170 PRINT"  TO CONTINUE PRESS AN
Y KEY"
180 C$=INKEY$:IF C$="" THEN 180
190 CLS
200 PRINT@5,;
210 INPUT"REG.HOURS WORKED";H
220 INPUT"     O.T.HOURS WORKED"
;O
230 PRINT"    ------------------
----"
240 INPUT"     WAGES/PER/HOUR ";
S
250 PRINT"    ------------------
----"
260 PRINTUSING"   REG SALARY IS
$####.##";H*S
270 PRINTUSING"   O T SALARY IS
$####.##";O*S*1.50
280 X=H*S
290 Z=O*S*1.50
300 W=X+Z
310 PRINT"                 -----
---"
320 PRINTUSING"GROSS WAGES ARE:
$####.##";W
330 INPUT"         F.I.C.A.";SS
340 INPUT"      FEDERAL TAX";FT
350 INPUT"        STATE TAX";ST
360 PRINT"                 -----
---"
370 PRINTUSING"NET WAGES ARE--->
$####.##";W-SS-FT-ST
390 INPUT" PRINTER OR SCREEN (P/
S)";T$
400 IF T$<> "S" AND T$<> "P" THE
N 390
410 IF T$= "S" THEN 190
420 IF T$= "P" THEN 430
430 ' PRINTER ROUTINE
440 PRINT#-2,CHR$(31);TAB(14);"
WEEKLY WAGES"
450 PRINT#-2,CHR$(30);"DATE: ";D
$
460 PRINT#-2:PRINT#-2,STRING$(80
,"=")
470 PRINT#-2,"         NAME
          GROSS        SS/WH
  FED/WH    ST/WH    NET WAGES"
480 PRINT#-2
490 NET=W-SS-FT-ST
500 PRINT#-2,TAB(2);N$;
510 PRINT#-2,TAB(22);
520 PRINT#-2,USING"  $#,###.##";
W;
530 PRINT#-2,TAB(39);
540 PRINT#-2,USING"$###.##";SS;
550 PRINT#-2,TAB(51);
560 PRINT#-2,USING"$###.##";FT;
570 PRINT#-2,TAB(60);
580 PRINT#-2,USING"$###.##";ST;
590 PRINT#-2,TAB(68);
600 PRINT#-2,USING"  $#,###.##";
NET
610 PRINT#-2,TAB(20);
620 PRINT#-2,USING"    REG HOURS
- ##.##";H;
630 PRINT#-2,USING"  O T HOURS #
#.##";O;
640 PRINT#-2,USING"  RATE- $##.#
#";S
650 CLS:INPUT"PRINT ANOTHER (Y/N
)";K$
660 IF K$<>"Y" AND K$<>"N" THEN6
50
670 IF K$="Y" THEN 690
680 IF K$="N" THEN 910
690 CLS:PRINT:INPUT"NAME";N$
700 PRINT:PRINT"TO CONTINUE PRES
S ANY KEY"
710 C$=INKEY$:IF C$="" THEN 710
720 CLS:PRINT@5,;
730 INPUT"REG.HOURS WORKED";H
740 INPUT"     O T HOURS WORKED"
;O
750 PRINT"    ------------------
----"
760 INPUT"     WAGES/PER/HOUR ";
S
770 PRINT"    ------------------
----"
780 PRINTUSING"  REG SALARY IS $
####.##";H*S
790 PRINTUSING"  O T SALARY IS $
####.##";O*S*1.50
800 X=H*S
810 Z=O*S*1.50
820 W=X+Z
830 PRINT
840 PRINTUSING"GROSS WAGES ARE:
$####.##";W
850 INPUT"         F.I.C.A.";SS
860 INPUT"      FEDERAL TAX";FT
870 INPUT"        STATE TAX";ST
880 PRINT"                 -----
---"
890 PRINTUSING"NET WAGES ARE--->
$####.##";W-SS-FT-ST:PRINT#-2
900 PRINT"   (PRINTING NEXT DATA
)":GOTO 490
910 CLS:PRINT@200,"THE END-THANK
S !!"
920 GOTO 920
```

A game of poker you can play without gullible buddies or beer nuts

JOKER POKER

BY ROBERT BRIMNER

Feel like turning CoCo into Lady Luck, cracking open a fresh deck of onscreen cards, and settling down to some extravagant betting? Presenting *Joker Poker*, a colorful version of Five Card Draw that allows you to place bets and accumulate (or lose) money depending on the cards CoCo deals you.

Don't worry if you're a little unsure of poker terminology. This game provides onscreen definitions of the various hands (a "flush" is five in the same suit, etc.), and lists the returns you can expect for each hand — for instance, if you bet $2 and draw a royal flush, you win $200 (but if you bet $20, you win $2,000!)

Pressing the R key brings up the rules, which include a list of what keys to use to place bets. Pressing S shows the score, E ends the game, and the space bar repeats your last bet.

After you have entered your bet, a graphic representation of five playing cards appears across the

---

Robert Brimner has a degree in electrical engineering and worked 30 years as a manager for Bell of Pennsylvania. Now retired, he enjoys music, tennis, bowling and writing useful or entertaining programs for the CoCo.

top of the screen. You're prompted to discard any or all of these cards by pressing keys 1 through 5 (if you want to get rid of the first card, press 1, for the second, press 2, etc.). When you press the space bar, CoCo deals your new cards; your winnings (or losses) are calculated according to the hand you end up with after the "draw."

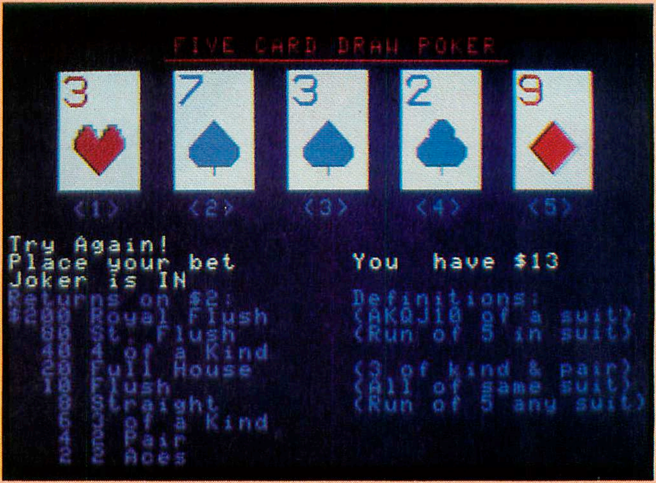
If you're in the mood to throw around some money, take some chances, and see what kind of dealer your CoCo can be, try a few hands of *Joker Poker* — and let the chips fall where they may!

(Questions about this game may be addressed to the author at 5427 Pocusset Street, Pittsburgh, PA 15217, 412-421-0126. Please enclose an SASE for a reply when writing.) ☐

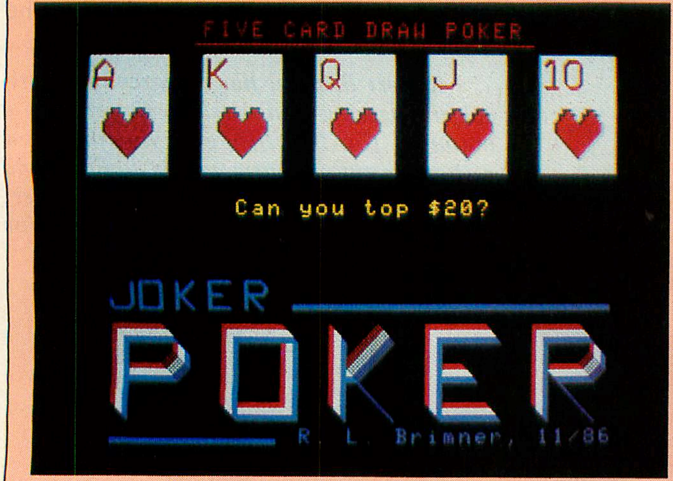
22	150	2067	93
31	28	5145	49
301	217	5203	241
480	164	5500	12
1099	179	5999	234
1200	21	6090	0
2002	239	END	148

The listing: POKER

```
1 CLS:POKE&HFFD9,0:PALETTERGB:PA
LETTE0,0:PALETTE2,11:PALETTE14,3
:HSCREEN2:CLS1'POKER GAME BY R.
L. BRIMNER
2 ONBRKGOTO5999:ONERRGOTO5999
3 POKE278,PEEK(274):POKE281,PEEK
(275)
5 DIMC(4,15),H$(5),H(5),N$(11),S
$(10):C(1,15)=8:C(2,15)=8:C(3,15
)=8
8 F$="SCORES"
10 HBUFF1,1155:HBUFF2,6560:HBUFF
3,8:HGET(0,0)-(160,80),2:H$(1)="
4E":H$(2)="4D":H$(3)="4C":H$(4)=
"4B":H$(5)="4A":GOSUB5914
13 GOSUB7000:POKE&HFFD8,0:OPEN"I
",#1,F$:FORQ=1TO9:INPUT#1,N$(Q),
S$(Q):NEXT:CLOSE#1:POKE&HFFD9,0:
IFS$(9)=""THENX$="20"ELSEX$=S$(9
)
14 HCOLOR3:HPRINT(10,0),"FIVE CA
RD DRAW POKER":HLINE(76,10)-(244
,10),PSET,B:X$="Can you top $"+X
$+"?":HCOLOR1:HPRINT(12,10),X$:S
OUND50,1:SOUND1,3:GOSUB5700:FORQ
=1TO4000:NEXT:GOSUB5602:Z=108:PA
LETTE0,1:CLS1
15 HB$="":TM=1:SW=1:AB=1:H9=-1:N
$="":HH=20:D=20
20 IFGB=0THENGOSUB5601:HCOLOR3:H
PRINT(10,10),"Press <R> for rule
s!
22 GOSUB5200:D$="":RM=2:GOSUB540
0:GOSUB5260:GOSUB1000:GOSUB1200
23 'BET LOOP
24 B$=INKEY$:IFB$=""THENIFD>0THE
NPR$="Place your bet":GOTO5210EL
SE24ELSESOUND100,1:GOSUB5270:IFB
$="R"THENH9=H9*-1:GOSUB1100:GOTO
24ELSEIFB$="S"THENH9=H9*-1:GOSUB
2000:GOTO24ELSEIFB$="E"THENH9=1:
GOSUB2000:GOTO24
25 IFB$=" "THENB$=HB$ELSEHB$=B$
26 IFB$="A"THENB=D ELSEIFB$="H"T
HENB=INT(D/2)ELSEIFB$="Q"THENB=I
NT(D/4)ELSEIFB$="T"THENB=INT(D*3
/4)ELSEB=VAL(B$):IFB$<"0"ORB$>"9
"THENELSEIFB=0THENB=10
27 IFB=0ORB>D THENB$="":GOTO24
28 AB=B:BT$=STR$(B):L=LEN(BT$)+1
:BT$=RIGHT$(BT$,L-2):D=D-B:PR$="
You bet $"+BT$:GOSUB5212:GOSUB52
00:IFB=>INT(D/4)THENRM=1:GOSUB54
00
```



```
Try Again!
Place your bet                You have $13
Joker is IN
Returns on $2:                Definitions:
$200 Royal Flush              (AKQJ10 of a suit)
  80 St. Flush                (Run of 5 in suit)
  40 4 of a Kind
  20 Full House               (3 of kind & pair)
  10 Flush                    (All of same suit)
   8 Straight                 (Run of 5 any suit)
   6 3 of a Kind
   4 2 Pair
   2 2 Aces
```



```
29 IFGB=0THENGOSUB5918ELSEGOSUB5
602
30 FORZ=1TO5:GOSUB5890:NEXT:GOSU
B5914:QT=0:QS=1:H9=-1:GOSUB1000
31 GOTO100
97 'DRAW LOOP
98 QT=0:IFH(1)+H(2)+H(3)+H(4)+H(
5)=-5THENQS=1ELSEQS=0
100 B$=INKEY$:IFQT=150ANDQS=0THE
N5990ELSEIFB$=""THENQT=QT+1:GOTO
5220
102 GOSUB5270:IFB$=CHR$(32)ORB$=
CHR$(13)ORB$="N"THEN200ELSEIFB$=
"S"THENH9=H9*-1:GOSUB2000:GOTO10
0ELSEIFB$="R"THENH9=H9*-1:GOSUB1
300:GOTO100ELSEIFB$="E"THENH9=1:
GOSUB2000:GOTO100ELSEIFB$="A"THE
NQS=0:GOSUB5602:GOTO98ELSEZ=VAL(
B$):IFZ<1ORZ>5THEN98
104 SOUND80,1:H(Z)=H(Z)*-1:Y=14:
X=24+(Z-1)*56
106 QS=0:IFH(Z)=1THENGOSUB5160:G
OTO98ELSEGOSUB5140:GOTO98
200 GOSUB5601:FORZ=1TO5:IFH(Z)=1
THENY=14:X=24+(Z-1)*56:H(Z)=0:GO
SUB5300:C(S,R)=8:C(0,R)=C(0,R)-1
:C(S,1)=C(S,14):C(0,1)=C(0,14):I
FR<15THENC(S,0)=C(S,0)-1ELSEELSE
210
205 GOSUB5890:GOSUB5140
210 NEXT:IFGB=0THENGB=1:GOSUB560
1
299 'DETERMINE THE RETURN
300 P=0:JK=C(0,15):AC=C(0,14):ST
=0:HJ=JK:FL=0:K3=0:K2=0:W=0:FORS
=1TO4:IFC(S,0)>4-JK THENFL=1:S=4
301 NEXT:IFFL=0THEN310ELSEFL=0
302 FORR=10TO1STEP-1:GOSUB5500
304 IFFL=1THENIFR>9THENP=15:GOTO
480ELSEP=16:GOTO480
306 NEXT:P=19:GOTO480
310 FORR=14TO2STEP-1:IFC(0,R)>1T
HENST=1
313 IFC(0,R)=>4-HJ THENP=17:GOTO
480
314 IFC(0,R)=3-HJ THENK3=1:HJ=0:
IFK2>0THEN470ELSE324
317 IFC(0,R)=2THENIFK2=1THENK2=2
:GOTO330ELSEK2=1:IFK3=1THEN470
320 IFST=0THENIFR<11THENGOSUB550
0:IFFL=1THEN326
324 NEXT:IFST=0THENGOSUB5500
325 IFFL<>1THEN330
326 P=20:GOTO480
330 IFK3=1THENP=21:GOTO480
332 IFK2=2THENP=22:GOTO480
334 IFAC=2ANDK2=1THENELSEIFAC=1A
NDJK=1THENELSE340
335 P=23:GOTO480
340 IFD>0THENHCOLOR4:HPRINT(0,11
),"Try Again!":SOUND80,1:SOUND1,
4:GOTO480ELSE480
470 P=18
480 IFP>0THENHCOLOR5:GOSUB1004:F
ORQ=1TO13:K=RND(50):SOUNDK,1:NEX
T:SOUND1,5:D=D+W:IFHH<D THENHH=D
 ELSEELSE495
490 GOSUB5200
495 GOSUB5700:IFD>0THENRM=3:GOSU
B5400:AB=1:GOTO24ELSEGM=1:Q=0:H9
=1:SOUND80,1:SOUND1,4:B$="":GOTO
2000
999 'SHOW THE RETURNS
1000 X=0:GOSUB5250:GOSUB1099:FOR
P=15TO23:GOSUB1004:NEXT:RETURN
1004 X$=" ":ONP-14GOSUB1010,1020
,1030,1040,1050,1060,1070,1080,1
090:RETURN
1010 X$="$":W=100*AB:L=LEN(STR$(
W)):PR$="Royal Flush":GOTO1093
1020 W=40*AB:PR$="St. Flush":GOT
O1093
1030 W=20*AB:PR$="4 of a Kind":G
OTO1093
```

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```
1040 W=10*AB:PR$="Full House":GO
TO1093
1050 W=5*AB:PR$="Flush":GOTO1093
1060 W=4*AB:PR$="Straight":GOTO1
093
1070 W=3*AB:PR$="3 of a Kind":GO
TO1093
1080 W=2*AB:PR$="2 Pair":GOTO109
3
1090 W=AB:PR$="2 Aces
1093 PN=L-LEN(STR$(W)):PR$=X$+RI
GHT$(STR$(W),LEN(STR$(W))-1)+" "
+PR$:HPRINT(PN,P),PR$:RETURN
1099 HCOLOR2:X$="Returns on $"+R
IGHT$(STR$(AB),LEN(STR$(AB))-1)+
":":HPRINT(0,14),X$:RETURN
1100 IFH9=1THENX=160:GOSUB5250:H
COLOR7:HPRINT(21,14),"<Keys> for
 betting:"ELSEGOSUB1200:GOTO24 '
SHOW BET RULES
1105 HPRINT(21,15),"<1-9,0> = $1
-$9,$10
1110 HPRINT(21,16),"<Q>=1/4 of $
":HPRINT(32,16),D
1115 HPRINT(21,17),"<H>=2/4 of $
":HPRINT(32,17),D
1120 HPRINT(21,18),"<T>=3/4 of $
":HPRINT(32,18),D
1125 HPRINT(21,19),"<A>=4/4 of $
":HPRINT(32,19),D
1130 HPRINT(21,20),"<Spacebar> w
ill re-":HPRINT(22,21),"peat you
r last bet"
1135 HPRINT(21,22),"<S> to see s
cores":HPRINT(21,23),"<E> to end
 game
1199 RETURN
1200 X=160:GOSUB5250:HCOLOR2:HPR
INT(21,14),"Definitions:":HPRINT
(21,15),"(AKQJ10 of a suit) 'SHO
W DEFINITIONS
1210 HPRINT(21,16),"(Run of 5 in
 suit)
1220 HPRINT(21,18),"(3 of kind &
 pair)
1230 HPRINT(21,19),"(All of same
 suit)
1240 HPRINT(21,20),"(Run of 5 an
y suit)
1250 RETURN
1300 IFH9=1THENX=160:GOSUB5250:H
COLOR6:HPRINT(21,14),"<Keys> for
 drawing:"ELSEGOSUB1200:GOTO100
'SHOW DRAW RULES
1305 HPRINT(21,16),"<1-5> will d
iscard,
1310 HPRINT(22,17),"or will reca
ll, an":HPRINT(22,18),"erroneous
 discard.
1315 HPRINT(21,19),"<A> Discards
 all 5!
1320 HPRINT(21,21),"<Spacebar> w
ill re-":HPRINT(22,22),"place ca
rds and/or":HPRINT(22,23),"conti
nue the game."
1399 RETURN
1999 'SHOW SCORES
2000 IFH9=-1THENX=160:GOSUB5250:
GOSUB1200:RETURNELSEGOSUB2002:IF
B$="S"THENRETURNELSEIFB$="E"THEN
2100ELSE2050
2002 X=160:GOSUB5250:HCOLOR9:IFN
$>""THENFORQ=9TO1STEP-1:IFHH>VAL
(S$(Q))THENS$(Q+1)=S$(Q):S$(Q)=S
TR$(HH):N$(Q+1)=N$(Q):N$(Q)=N$EL
SEQ=1ELSE2005
2003 NEXT
2005 HPRINT(21,14),"Nine high sc
ores:
2010 FORQ=1TO9:Q$=RIGHT$(STR$(Q)
,2)+LEFT$(" "+N$(Q)+"           ",9
)+S$(Q):HPRINT(20,14+Q),Q$:NEXT
2011 RETURN
2050 IFHH>VAL(S$(9))ANDHH>20THEN
ELSE2067
2052 SOUND80,1:L=0:HCOLOR1:GOSUB
5204:HPRINT(21,12),"Your name?"
2055 HLINE(257,103)-(263,103),PS
ET,B:HGET(257,103)-(263,103),3
2060 M$=INKEY$:IFM$=""THENHPUT(2
57+L*8,103)-(263+L*8,103),3,PSET
:GOTO2060ELSEHPUT(257+L*8,103)-(
263+L*8,103),2,PSET:IFM$=CHR$(8)
THEN2068ELSEIFM$>CHR$(31)ANDL<8T
HENHPRINT(32+L,12),M$:N$=N$+M$:L
=LEN(N$):GOTO2070
2065 POKE282,255:IFM$<>CHR$(13)T
HENN$="":GOTO2050ELSEIFN$>""THEN
GOSUB2002:GOTO2120
2067 GOSUB5204:IFB$="E"THEN2142E
LSE2140
2068 HPUT(249+L*8,96)-(263+L*8,1
03),2,PSET:L=L-1:IFL<1THENN$="":
GOTO2050ELSEN$=LEFT$(N$,L):GOTO2
060
2070 IFL=1THENPOKE282,0:GOTO2060
ELSE2060
2100 SOUND80,1:HPRINT(5,11),"Do
you want to END GAME (Y/N)?"
2110 A$=INKEY$:IFA$=""THEN2110EL
SEIFA$="Y"THEN2050ELSEGOSUB5270:
GOSUB5200:RETURN
2120 GOSUB5270:HPRINT(13,11),"Sa
ving scores!"
```

```
2125 POKE&HFFD8,0:OPEN"O",#1,F$
2130 FORQ=1TO9:WRITE#1,N$(Q),S$(
Q):NEXT:CLOSE#1:IFH9=0THENCLS:PR
INT"SCORES file established/clea
red!":STOPELSEPOKE&HFFD9,0:GOTO2
140
2140 SOUND80,1:GOSUB5270:HPRINT(
6,11),"Press <ENTER> to play aga
in"
2141 A$=INKEY$:IFA$<>CHR$(13)THE
N2141
2142 GOSUB5270:GOSUB5602:Z=108:G
OTO15
5000 'SUB ROUTINES
5140 IFH9=0THENHCOLOR14:HLINE(X,
Y)-(X+40,Y+54),PSET,B:HCOLOR4:HL
INE(X+1,Y+1)-(X+39,Y+53),PSET,BF
:HGET(X,Y)-(X+40,Y+54),1:GOTO515
0
5145 HPUT(X,Y)-(X+40,Y+54),1,PSE
T
5150 GOSUB5300:IFR=15THENHDRAW"S
4C14":HX=X+1:HY=Y+8:GOSUB6000:GO
SUB6010:RETURN ELSEHDRAW"S8C14":
HX=X+3:HY=Y+15:GOSUB5152:IFS>2TH
ENHCOLOR3ELSEHCOLOR2
5151 HX=HX+1:GOSUB5152:HY=HY+1:G
OSUB5152:GOTO5155
5152 GOSUB6020:ONR-1 GOSUB6025,6
030,6035,6040,6045,6050,6055,606
0,6065,6080,6100,6085,6070:RETUR
N
5155 HX=X+8:HY=Y+35:GOSUB6020:ON
S GOSUB6120,6125,6110,6115:RETUR
N
5160 HPUT(X,Y)-(X+40,Y+54),2,PSE
T:H(Z)=1:RETURN
5200 HCOLOR4:GOSUB5204:IFD>0THEN
D$=STR$(D):PR$="You  have $"+RIG
HT$(D$,LEN(D$)-1)ELSEPR$="You ar
e broke!"
5202 HPRINT(21,12),PR$:H$=STR$(H
H):X$="Your high $"+RIGHT$(H$,LE
N(H$)-1):HPUT(160,104)-(320,111)
,2,PSET:IFHH>20THENHPRINT(21,13)
,X$
5203 RETURN
5204 HPUT(160,96)-(320,103),2,PS
ET:RETURN
5210 HPUT(0,96)-(112,103),2,PSET
:TM=TM*-1:IFTM=1THENELSEHCOLOR4:
HPRINT(0,12),PR$:FORQ=1TO360:NEX
T
5211 GOTO24
5212 HPUT(0,96)-(112,103),2,PSET
:HCOLOR4:HPRINT(0,12),PR$:RETURN
5220 IFQS=1THENHPUT(0,88)-(112,9
5),2,PSET:TM=TM*-1:IFTM=1THENELS
EHCOLOR4:HPRINT(0,11),"Draw?":FO
RQ=1TO360:NEXT
5221 GOTO100
5250 HPUT(X,112)-(X+160,192),2,P
SET:RETURN
5260 HPUT(0,Z+4)-(320,Z+44),2,PS
ET:HPUT(0,Z+45)-(320,Z+85),2,PSE
T:RETURN
5270 HPUT(0,88)-(320,95),2,PSET:
RETURN
5300 S=VAL("&H"+LEFT$(H$(Z),1)):
R=VAL("&H"+RIGHT$(H$(Z),1)):RETU
RN
5400 HCOLOR4:IFRND(RM)=1THENC(4,
15)=0:X$="Joker is IN"ELSEC(4,15
)=8:X$="Joker is OUT"
```

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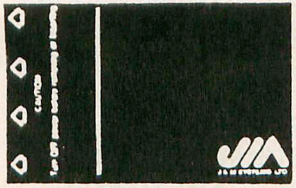

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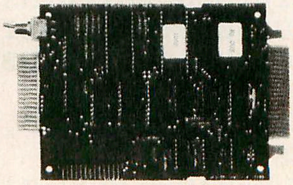

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```
5401 HPUT(72,104)-(95,111),2,PSE
T:HPRINT(0,13),X$:RETURN
5500 IFC(0,R)+C(0,R+1)+C(0,R+2)+
C(0,R+3)+C(0,R+4)+C(0,15)>4THENF
L=1
5501 RETURN
5601 HPUT(32,80)-(288,87),2,PSET
:RETURN
5602 Y=14:Z=0:FORX=24TO264STEP56
:Z=Z+1:GOSUB5160:NEXT:RETURN
5700 C(0,15)=0:FORR=0TO14:FORS=0
TO4:C(S,R)=0:NEXT:NEXT:RETURN
5890 S=RND(4):R=RND(14)+1:IFC(S,
R)>0THEN5890
5895 C(S,R)=9:C(0,R)=C(0,R)+1:H$
(Z)=HEX$(S)+HEX$(R):C(S,1)=C(S,1
4):C(0,1)=C(0,14):IFR<15THENC(S,
0)=C(S,0)+1:RETURNELSERETURN
5914 Y=14:Z=1:Q=1:FORX=24TO264ST
EP56:GOSUB5140:SOUNDQ,1:Q=Q+20:H
(Z)=-1:Z=Z+1:NEXT:RETURN
5918 HCOLOR2:HPRINT(4,9),"<1>
 <2>    <3>    <4>    <5>":RETUR
N
5990 SOUND100,2:QS=1:GOSUB5601:H
COLOR3:HPRINT(4,10),"Press <SPAC
EBAR> for new cards!":QT=0:GOTO1
00
5999 POKE282,255:PALETTERGB:WIDT
H40:POKE&HFFD8,0:CLS1:PRINT"ERNO
";ERNO;"ERLIN"ERLIN:IFERLIN=13TH
ENLOCATE0,1:PRINT"Did you enter,
 'F$="CHR$(34)"SCORES"CHR$(34)":
GOTO 2125', to establish SCORES?
":STOPELSESTOP
6000 GOSUB6020:GOSUB6080:GOTO600
8 'SUB ROUTINES FOR HDRAW
6005 GOSUB6020:GOSUB6095
6008 GOSUB6090:GOSUB6085:GOSUB60
75:GOSUB6105:RETURN
6010 DRAW"S4":HX=X+14:HY=Y+23:GO
SUB6020:GOSUB6115:HX=X+26:HY=Y+3
2:GOSUB6020:GOSUB6120:HX=X+14:HY
=Y+41:GOSUB6020:GOSUB6110:HX=X+3
:HY=Y+32:GOSUB6020:GOSUB6125:RET
URN
6020 X$="BM"+STR$(HX)+","+STR$(H
Y):HDRAWX$:RETURN
6025 HDRAW"BU4UER3FDGLG3R5BR4":R
ETURN'2
6030 HDRAW"BU5ER3FDGNL2FDGL3HBDB
R9":RETURN'3
6035 HDRAW"BR4U6G4R5BD2BR4":RETU
RN'4
6040 HDRAW"BUFR3EUHL4U3R5BR4BD6"
:RETURN'5
6045 HDRAW"BUU4ER3NFBD3NL3FDGL3N
HBR8":RETURN'6
6050 HDRAW"E5UL5BR9BD6":RETURN'7
6055 HDRAW"BRHUEHUER3FDGNL3FDGL3
BR8":RETURN'8
6060 HDRAW"BUFR3EU4HL3GDFR3BR5BD
3":RETURN'9
6065 HDRAW"R3LU6LGBR5BD5BUU4ER2F
D4GL2NHBR9":RETURN'10
6070 HDRAW"U4E2F2D2NL4D2BR4":RET
URN
6075 HDRAW"U3NR3U3R5BD6L5BR9":RE
TURN'E
6080 HDRAW"BU2DFR3EU5BD6BR2":RET
URN'J
6085 HDRAW"U6D3RNE3F3BR4":RETURN
'K
6090 HDRAW"U6R5D6L5BR9":RETURN'0
6095 HDRAW"U6R4FDGL4BD3BR9":RETU
RN'P
6100 HDRAW"BR2LHU4ER2FD3G2BU2F2B
R4":RETURN'Q
6105 HDRAW"U6R4FDGL3F3BR5":RETUR
N'R
6110 C=14:HDRAW"C14E6F6G6H6":HCO
LOR3:GOTO6130
6115 C=14:HDRAW"C14U2EURUR2DRDFE
URUR2DRDFD2G6H6":HCOLOR3:GOTO613
0
6120 C=14:HDRAW"C14E6F6D2G2L4D2U
2L4H2U2":HCOLOR2:GOTO6130
6125 C=14:HDRAW"C14E2RU2E2R2F2D2
RF2D2G2L4D2U2L4H2U2":HCOLOR2:GOT
O6130
6130 HPAINT(PEEK(199)*256+PEEK(2
00)+8,PEEK(201)*256+PEEK(202)),,
C:RETURN
6999 'SUB ROUTINE FOR THE TITLE
7000 Z=108:U=35:V=172:FORY=1TO3:
HCOLOR3:IFY=2THENHCOLOR4ELSEIFY=
3THENHCOLOR2
7005 HDRAW"S8":HX=35:HY=Z+20:GOS
UB6000:HY=HY+1:GOSUB6000:HX=36:G
OSUB6000:HLINE(125,HY-2)-(285,HY
),PSET,BF
7010 HDRAW"S24":FORX=1TO3:HX=U:U
=U+1:HY=V:V=V+1:GOSUB6005:NEXT
7015 HDRAW"S4":HY=Z+83:HLINE(35,
HY-2)-(116,HY),PSET,BF:HPRINT(16
,23),"R. L. Brimner, 11/86":NEXT
:RETURN
```

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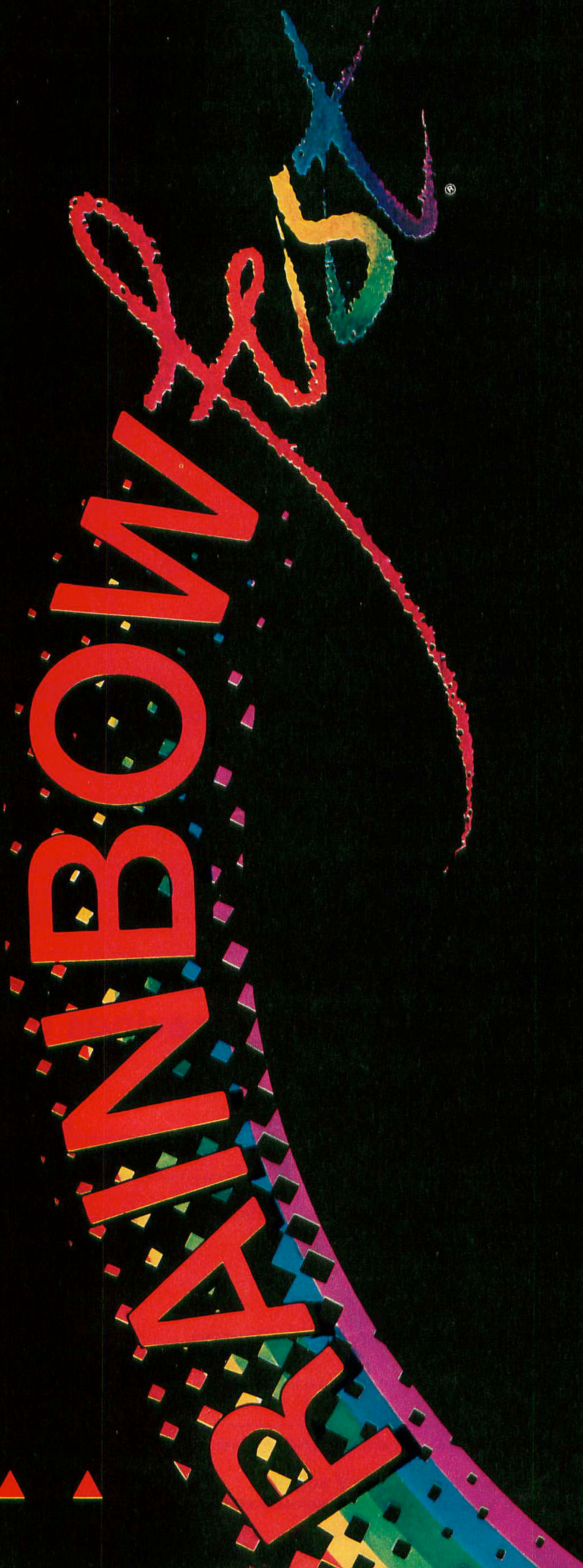
April 10-12



Feel the energy of the city. Fresh, provocative. This spring, there's another glittering light in the Chicago skyline — RAINBOWfest!

Explore stimulating new ideas and broaden your horizons at RAINBOWfest, the only computer show dedicated exclusively to your Tandy Color Computer. The CoCo Community congregates April 10 to 12 at the Hyatt Regency Woodfield and we want you to join us.

This is where commercial distributors gather to show off **new and innovative products** for the first time. Where RAINBOW authors and CoCo experts come to share their expertise in **seminars and one-to-one chats**. Where hardware and software sell for **low RAINBOWfest prices**.

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Only 15 minutes from O'Hare International Airport, RAINBOWfest provides a perfect get-away weekend not only for the computer fanatic, but for the whole family. We're right across the street from the world's largest mall and just 30 minutes from downtown Chicago.

The show begins Friday evening with the exhibit hall open from 7 p.m. to 10 p.m. Saturday's action is nonstop beginning with the 8 a.m. CoCo Community Breakfast (separate tickets required). Our featured speaker is Greg Zumwalt, president of ZCT software. Exhibits and seminars will be in full swing from 10 a.m. to 6 p.m., and from 11 a.m. to 4 p.m. on Sunday. That will be hardly enough time to see and do everything you'll want to, between scheduled events and our new **Educational Sandbox** for the kids — plus a **special appearance by CoCo Cat**, too!

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Friday evening
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Saturday
- — CoCo Community Breakfast at 8 a.m.
- — Exhibits open at 10 a.m. and close at 6 p.m.

Sunday
- — Exhibits open from 11 a.m. to 4 p.m.

CoCo Community Breakfast

Greg Zumwalt — CoCo 3 Programmer

Our keynote speaker for the traditional CoCo Community Breakfast is Greg Zumwalt, one of the early CoCo specialists who has created everything from flight simulators to computer games. An independent programmer and computer designer, Greg is one of the few people Tandy has selected to write software for the new Color Computer 3. He owns ZCT Software, of Tulsa, Okla., and also writes software for business applications in such areas as aviation, the oil industry and the medical field.

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Doing the Program Shuffle

By Joseph Kolar
Rainbow Contributing Editor

It is time to put `MID$` function under the microscope. Last month, you were asked to save `PART1`, the first part of `PROGRAM`.

In that portion of the program, you blanked out a portion of a sample sentence and then supplied the missing text. The `MID$` function can handle this problem effectively. To your credit, you managed to invoke an alternate method.

Look at the `PART1` listing. It may be a bit different from your copy in some minor aspects. I extracted my version from the completed `PROGRAM`. This is a good programming technique — extract pertinent parts of an existing program to save time and effort in recreating that which is extant.

Load `PART1` or, if you desire, key in the listing for `PART1` in this issue. Drop `GOTO20` from Line 10. It serves no purpose. Delete `GOTO40` from lines 24, 26 and 28. If you followed instructions implicitly, the four truncated lines end in a colon.

CoCo ignores a final colon because, finding no instructions after it, it goes on to the next statement. Ending a program line with a dangling colon looks so amateurish, especially in a finished product.

A final colon is a hint. It cries out that you may want to add some `GOTO/GOSUB` routine here to present a new problem or condition. It also hollers, "Here I am! Here is where a routine could be added!"

The reserved Line 40 is harmless, and is a constant reminder that the next segment has a home waiting for it. The real reason for these particular changes is to cycle through all the variations in succession in a perpetual loop.

`MID$` function allows CoCo to replace a designated portion of a string, `S$`, beginning at the `A`th character/space, for a length of `N` characters/spaces and replace same with an appropriate replacement string.

Our specific problem is to operate on Line 21 and make various modifications. It is one thing to know what a statement or function does. It is another to put it to good use.

List Line 5. Lines 3 and 5 did the work. We know that we must have a complete sentence, `X$`. Rekey 5 `PRINT@X, X$;:RETURN` and run. You can see that it prints out `X$` just fine. Do not be deceived or overconfident, however. We don't know precisely where we will wind up. Rekey Line 5, `P=181:PRINT@X,LEFT$(X$,P);:RETURN`, and run. This is our expanded statement.

In order to portray the second, translating sentence, type `EDIT 5` to delete, press `RETURN` and add our `MID$` function, `:MID$(Y$,A,N)=STRING$(N,143):PRINT@Y,Y$;:RETURN`. Now run. FC Error in 5! FC means there is an illegal function error in the line called or some line executed previously by CoCo. Press `BREAK`. If typing `PRINT Y$` and pressing `ENTER` prints string `Y$` OK, we can eliminate Line 5 as the culprit. Line 23 was the last line CoCo ran through before it pooped out. Let's check the `A` and `N` values. Uh-Oh! In `MID$` function, `A` must be at least 1. Under our previous method, `A` was the screen location. Now, it is the numerical value of the first character/space that we pinpoint to be blanked out.

Edit Line 23, changing `0` to `1`, and run. We have a partially blanked-out sentence. At the end of Line 24, add `GOTO10` and run. How are we going to fill in the balance of the sentence to make it whole?

List Line 24. `GOSUB 4` doesn't do it! Let's change `4` to `3` in Line 24 and see if `GOSUB 3` handles it. No! Why?

Think about it for a few minutes. Press `BREAK`, type `PRINT Y$` and press `ENTER`. We get the blank-out sentence that is equal to string `Y$`. We changed `Y$` from its original form (Line 21). We must recapture the original `Y$`.

One way to have our cake and eat it, too, is to create a new string variable, `S$`, which is equal, yet distinct, from `Y$`. Doing so allows us to work on `S$` and change its contents without losing the original `Y$`. Can you alter Line 5 to do this?

Edit Line 5 and insert `S$=Y$:` at the beginning. Change both `Y$`s to `S$`s and run. We see a flicker, so we know that we did it! Change Line 24, drop off `GOTO10` and run. The second variation is not quite with it. It should be apparent that `A` must be augmented by `+1`. Make the change in Line 25 and run. You now have an equivalent of listing `ALT`. Save `ALT` after you make an appropriate change in Line 0.

Last month, when we created our `PROGRAM`, I wasn't sure what additional havoc we might wreak on the paired sentences, so I automatically added all those `LEFT$` statements requiring `P` and `Q` values to make them operational.

Continuing, we look over our work to tighten it up. Look at listing `ALT1`. Make modifications to `ALT` that should still be in CoCo's memory.

Now that I have made a big deal out of the `LEFT$` routines, let us assume that our ultimate program will stay within the confines of our basic idea.

Florida-based Joseph Kolar is a veteran writer and programmer and specializes in introducing beginners to the powers of the Color Computer.

In Line 5, substitute the short, one-purpose `PRINT@X,X$;` for `P=181:PRINT@X,LEFT$(X$,P);` and run. In Line 4, substitute for `Q=181:PRINT@Y,LEFT$(Y$,Q);`, the equivalent, `PRINT@Y,Y$;` and run.

List Line 5. In the `MID$` function part of Line 5, the length, `N`, of the portion of `S$` that is to be replaced, may be omitted if the entire replacement string will be used. In our program, the replacement string, `STRING$(N,143)`, contains the length, `N`. Edit Line 5 further by deleting `,N` in the `MID$` function and run it.

Now list. Observe that `GOSUB5` is followed by `EXEC44539:GOSUB4` in a following program line in all four variants.

This calls for `GOSUB`ing the `GOSUB`, a favorite ploy. We choose a program line, 2, so we don't have to overtax our mental resources. Key in Line 2, `GOSUB5:EXEC44539:GOSUB4:RETURN`.

In Lines 23, 25, 27 and 29, change 5 to 2. Delete the four unrequired lines 24, 26, 28 and 30. Now run this. The result should be listing `ALT`, which you should save.

A few asides on `GOSUB`. With a little ingenuity, you might have worked out one long `GOSUB5` by dropping `RETURN` and including the `EXEC44539` from Line 2 and the scoop in Line 4. Naturally, you would delete lines 2 through 4 and change 2 to 5 in lines 23 through 29. Run your work. See listing `ALT2`.

The self-imposed limitations are that you can't use the hot scoop in `GOSUB4` by itself, much less the scoop in the original `GOSUB5`. (See `ALT1`.) We have cut down on our options.

A long multi-statement program line is difficult for a newcomer to work with. A case in point: Using either `ALT1` or `ALT2` as a guide, modify our program so that in string `Y$`, both `BIG` and `OLD` are blanked out together. That's a good problem. Which listing would you rather use?

Big deal me! I started to tinker with Line 5 in `ALT2` and quickly became confused and got lost. I wound up using `ALT1`. Now, I could use Line 5 as a model or guide. It didn't take long before one solution was discovered. Look over listing `PROBLEM`. Can you follow my thinking?

The basic plan ran thusly: To blank out one area, we required two forms of the second, translating sentence, `Y$`, the complete sentence, and `S$`, the modified sentence with one blank-out.

It would not serve our purpose to have `T$=Y$` to develop our second blank-out. I may be wrong, but we would get either the first or second blank-out, never both. If `T$=S$`, (one blank-out), we could modify `S$` to make the second blank-out. Thus, `T$` should print both blank-outs so `T$` would provide the desired effect.

> ***"One of the secrets of using* TRON *effectively is to isolate the suspect portion of a program."***

Key in `PROGRAM` and run. Now list Line 23. In Line 23, we determined the `A` and `N` values to hide `BIG` and used `GOSUB5` to print it. We did not need to print it. We could have deleted `:PRINT@Y,S$;`. Delete it and run. As soon as `GOSUB5` executed it and returned, we knew (using Line 5 as a model) that the next order of business would be to extract what information we need to display the additional blank-out and modify it so it wouldn't conflict with Line 5.

Compare Line 6 to Line 5. We had to make `T$=S$`. Having already printed the top sentence, `X$`, we skipped over it. We used `MID$` function for the second time. We played it safe and changed our variables, `B` equivalent to `A` and `M` equivalent to `N`, both working on `T$`, not `S$`!

Now, we printed our `T$` sentence that contains the pair of blank-outs. We paused for a key to be pressed and returned to continue.

Look at Line 23! Our two values to zap `OLD` were `B=22` and `M=5`, followed by `GOSUB6` (sic). We headed for `GOSUB4` and over-printed `T$` with `Y$`, the completed sentence. We paused for a key press, chose a different color and returned to attack the next variant.

We combined `GOSUB6` and `GOSUB4` into a single `GOSUB7`, merely as a simplification in programming.

Note the `B` and `M` values in Line 23 can easily be distinguished as the values necessary to produce the second blank-out. It also announces in a program line that two blank-outs exist.

As you will agree, it is better to have many short `GOSUB`s as opposed to a few long ones. In this last program, we used `GOSUB5` in both the single and double blank-out routines.

I love to work with `GOSUB` routines. CoCo doesn't mind, and hops back and forth dutifully in a flash.

Did you note how one creative program solved a problem, suggested a new problem — and away we went! From `PART1` to `ALT` to `ALT1` to `ALT2` to `PROBLEM`. We could go on and make other modifications, but we have gotten sufficient practice with `MID$` function.

`TRON` and its sister command `TROFF`, are a pair of debugging goodies that are all too often ignored or misunderstood by the newcomer.

`TRON` is the command that is entered into CoCo, allowing CoCo to list, in square brackets, the numbers of the lines that are being executed sequentially. The newcomer becomes disenchanted when he activates `TRON`, only to see CoCo go berserk in a runaway state. It fast becomes confusing, disillusioning, and finally, hopeless. `TROFF` is quickly invoked to return to a normal state of chaos. Sound familiar?

One of the secrets of using `TRON` effectively is to isolate the suspect portion of a program. The good part is that you can generally run a program, beginning with any line number you designate. For example, `RUN40` or `RUN200` starts executing the program at lines 40 and 200, *respectively.*

The bad part is that it will run through to the end of the program unless it is tied up waiting for an input, passing beyond the error, and effectively shielding it from detection. Disappointingly, it will pass through a lot of program lines without listing them on the screen.

Type `CLOAD"ALT1" TRON`, press ENTER and run. The display we see has `20; 2; 23; 2; 5;` in brackets at the top of the screen and sentences `X$` and `Y$` displayed.

List Line 20. You can see that lines 0, 1 and 10 precede the lines in the first display. Now run. What happened to them and how do you know CoCo passed through them?

A general rule is that if CoCo does something to alter the visible screen, it will be indicated in brackets — general, but not universal.

Edit Line 10 to insert `STOP` at the beginning, and run. Now you can see that CoCo noticed the REM line, 0. It read and stored a couple of variables, a formula and some instructions in Line 1, then went as directed to Line 10 and stopped. Type CONT and press ENTER.

CoCo cleared the screen at 10, obliterating 0, 1 and 10.

Rekey Line 10 CLSZ: and run. CoCo read and committed to memory lines 20 and 21; read and absorbed the value of variables A and N, 23; and jumped to 2. There it was told to print X$ and S$, at which point, returning to the next part of Line 2, it waited with bated breath for instructions.

List Line 23. What do you expect to happen? Run and see. CoCo is still entwined in Line 2. Since a key was pressed, granting CoCo permission to continue, it executed Line 4 and displayed Y$, and at the end of the newly displayed line, 4. Again, it awaits your pleasure. It goes to the next variation, Line 25, and does its thing as requested. Go through the rest of the variations.

Another way to look at it is to consider each set of brackets as a stepping stone in a path that wends its way through a routine. Since it spells out the progression through the routine only, it is advisable to have a hard copy or the listing for comparison, to avoid switching back and forth between the listing and the display.

Type NEW CLOAD"PART1". Keep in mind, if you don't TROFF before you load in the new listing, you will remain in TRON mode. Now run.

Notice where 24 appears on the display. The GOSUB routines are somewhat different. See if you can follow this! The last thing that happened was the alteration of Y$ by creating the blank area, followed by 24, impinging on the text. CoCo pauses for permission to continue.

For a better perspective, delete the final GOTOs in lines 10, 24, 26 and 28, and run through the whole routine. Observe each stepping stone. CoCo is so sophisticated! Note that after lines 28 and 30 are executed, the next step is Line 4 in both instances. Where was 4 after 24 or 26?

I can only guess that the ending in the last two variations of Y$ were blanked out, causing CoCo to invoke Line 4 to change the last segments of the display. Thus, the last change was a highlighted stepping stone, Line 4.

Right or wrong, the point is that some stepping stones are omitted. It all depends on the individual display since all four variant routines, lines 23 through 30, tell it to perform similar operations.

That is what makes TRON of limited value to a newcomer. It becomes more and more useful as you gain confidence and experience.

In my judgment, a newcomer should call on TRON, especially when checking out small routines. If the stepping stones seem incomprehensible, TROFF, and resort to a more familiar technique such as trial and error, intuitive changes, or studying the listing.

In other instances, as in PROBLEM, a stepping stone will overprint previous stepping stones and give you an apparent erroneous sequence. For example, the first variation ends in 7; 6. Then after a key press, 4 is printed over 7. But, it looks like 4; 6, due to 6 remaining on the screen.

TRON is a fun tool that is helpful in understanding what CoCo is doing, and when. It will give you a new perspective, and increase your respect for CoCo's amazing versatility. ☐

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Listing 1: PART 1

```
0 '<PART1>
1 X=97:Y=225:Z=RND(7)+1:IF Z=6 G
OTO1 ELSE GOTO 10
3 PRINT@X,LEFT$(X$,P);:PRINT@Y,L
EFT$(Y$,Q);:RETURN
4 Q=181:PRINT@Y,LEFT$(Y$,Q);:EXE
C44539:CLSZ:RETURN
5 P=181:Q=P:GOSUB3:PRINT@Y+A,STR
ING$(N,143);:RETURN
10 CLSZ:GOTO20
20 X$="  DIE STADT IST GROSS UND
 ALT. "
21 Y$="  THE CITY IS BIG AND OLD
. "
23 A=0:N=11:GOSUB5
24 EXEC44539:GOSUB4:GOTO40
25 A=13:N=4:GOSUB5
26 EXEC44539:GOSUB4:GOTO40
27 A=22:N=5:GOSUB5
28 EXEC44539:GOSUB4:GOTO40
29 A=18:N=4:GOSUB5
30 EXEC44539:GOSUB4
40 '
995 CLSZ:GOTO10
```

Listing 2: ALT

```
0 '<ALT>ERNATE
1 X=97:Y=225:Z=RND(7)+1:IF Z=6 G
OTO1 ELSE GOTO 10
```

```
4 Q=181:PRINT@Y,LEFT$(Y$,Q);:EXE
C44539:CLSZ:RETURN
5 S$=Y$:P=181:PRINT@X,LEFT$(X$,P
);:MID$(S$,A,N)=STRING$(N,143):P
RINT@Y,S$;:RETURN
10 CLSZ
20 X$="  DIE STADT IST GROSS UND
 ALT. "
21 Y$="  THE CITY IS BIG AND OLD
. "
23 A=1:N=11:GOSUB5
24 EXEC44539:GOSUB4
25 A=14:N=4:GOSUB5
26 EXEC44539:GOSUB4
27 A=22:N=5:GOSUB5:
28 EXEC44539:GOSUB4
29 A=18:N=4:GOSUB5
30 EXEC44539:GOSUB4
40 '
995 CLSZ:GOTO10
```

Listing 3: ALT1

```
0 '<ALT1>
1 X=97:Y=225:Z=RND(7)+1:IF Z=6 G
OTO1 ELSE GOTO 10
2 GOSUB5:EXEC44539:GOSUB4:RETURN
4 PRINT@Y,Y$;:EXEC44539:CLSZ:RET
URN
5 S$=Y$:PRINT@X,X$;:MID$(S$,A)=S
TRING$(N,143):PRINT@Y,S$;:RETURN
10 CLSZ:
20 X$="  DIE STADT IST GROSS UND
 ALT. "
21 Y$="  THE CITY IS BIG AND OLD
. "
23 A=1:N=11:GOSUB2
25 A=14:N=4:GOSUB2
27 A=22:N=5:GOSUB2
29 A=18:N=4:GOSUB2
40 '
995 CLSZ:GOTO10
```

Listing 4: ALT2

```
0 '<ALT2>
1 X=97:Y=225:Z=RND(7)+1:IF Z=6 G
OTO1 ELSE GOTO 10
5 S$=Y$:PRINT@X,X$;:MID$(S$,A)=S
TRING$(N,143):PRINT@Y,S$;:EXEC44
539:PRINT@Y,Y$;:EXEC44539:CLSZ:R
ETURN
10 CLSZ
20 X$="  DIE STADT IST GROSS UND
 ALT. "
21 Y$="  THE CITY IS BIG AND OLD
. "
23 A=1:N=11:GOSUB5
25 A=14:N=4:GOSUB5
27 A=22:N=5:GOSUB5
29 A=18:N=4:GOSUB5
40 '
995 CLSZ:GOTO10
```

Listing 5: PROBLEM

```
0 '<PROBLEM>
1 X=97:Y=225:Z=RND(7)+1:IF Z=6 G
OTO1 ELSE GOTO 10
2 GOSUB5:EXEC44539:GOSUB4:RETURN
4 PRINT@Y,Y$;:EXEC44539:CLSZ:RET
URN
5 S$=Y$:PRINT@X,X$;:MID$(S$,A)=S
TRING$(N,143):PRINT@Y,S$;:RETURN
6 T$=S$:MID$(T$,B)=STRING$(M,143
):PRINT@Y,T$;:EXEC44539:RETURN
7 GOSUB6:GOSUB4:RETURN
10 CLSZ:
20 X$="  DIE STADT IST GROSS UND
 ALT. "
21 Y$="  THE CITY IS BIG AND OLD
. "
23 A=14:N=4:GOSUB5:B=22:M=5:GOSU
B7
25 A=1:N=11:GOSUB2
27 A=6:N=5:GOSUB5:B=18:M=4:GOSUB
7
29 A=11:N=3:GOSUB2
40 '
995 CLSZ:GOTO10
```

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BITS AND BYTES OF BASIC

Exploring the CoCo 3 Color System

By Richard A. White
Rainbow Contributing Editor

Using last month's program, you can display any grouping of up to 16 CoCo 3 colors and see their numbers. Why Color 38 should be orange or Color 9 bright blue is elusive.

The situation is further muddied since TV and composite video color monitors display colors differently than the CM-8 analog RGB monitor does. This led Ed Ellers to suggest that the CM-8 monitor was added after the TV interface was complete (January 1987, Page 24). It turns out that the color numbering arrangement is coldly logical, at least to the CoCo 3 and the CM-8. It's the TV system that's out of phase.

The key to the way both TV and RGB analog monitors work is called "additive color mixture" by my college physics text (I looked it up). Now my book is a bit old, predating color television, but it has the principles right. We'll update the example using the color cathode ray tube instead of projectors with colored lenses.

Each dot on the screen is really three dots, one green emitter, one blue emitter and one red emitter. There are three electron guns: one to shoot at red dots, one to shoot at green dots and one to illuminate the blue dots. How bright each dot is depends on the strength of the electron beam aimed at it.

The eye cannot detect the components in any color mixture. In this respect, the eye differs from the ear. Those who have one of the multi-voice music synthesizers for the CoCo will attest that they can hear the separate notes in a chord. The listener does not hear a single middle pitch between the tones being sounded. The ear is analytical while the eye is not. So, if the red dot and the green dot of a pixel are illuminated the observer sees a yellow dot. If the red dot is strongly illuminated while the green dot is weakly illuminated, the result is orange.

Sixty-four colors are available in the CoCo 3 system. The low-order six bits in a byte define the color for the palette. Because composite video and TV work differently from the CM-8 monitor, it is not unreasonable to expect some differences in color display.

In composite video systems the two highest-order bits carry intensity information, so there can be four intensities for each basic color. You might say there are five intensities since, if both bits are off, black results. That leaves the four lower-order bits to specify the color. The result is four intensities of 16 basic colors. According to Rick Adams and Dale Lear, these bits control color phase in the signal (January 1987, Page 20). As we will see, this system is more restrictive and less subject to logical analysis than the analog monitor system.

When using the analog monitor, the CoCo 3 controls three separate color signals that are sent to the monitor. There are separate wires in the cable for red, green and blue. Each of the signals may be off, or be at low, medium or high intensity levels. Each directly controls its dot in a pixel. There is no phase shifting and decoding. You can directly decode a color number to determine the illumination state of each of the color dots in a pixel.

A byte is usually represented as a series of eight bits. The left-most bit is the high-order bit, while the right-most bit is the lowest-order bit. This bit is designated '0' while the eighth bit is designated '7'. For example:

Bit Number	7	6	5	4	3	2	1	0
Bit Value	0	1	1	0	1	0	1	0

A bit with a value of 1 is on, while a value of 0 indicates the bit is off. Each of the six bits the palette deals with to determine color in the analog RGB system has a specific meaning:

Bit Number	7	6	5	4	3	2	1	0
Bit Meaning	X	X	R1	G1	B1	R0	G0	B0

'R', 'G' and 'B' refer to red, green and blue. The '0' and the '1' pertain to color intensity. If Bit 0 only is on, blue will be turned on at low intensity. The color number is 1. If Bit 3, corresponding to

---

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the coauthor of the* TIMS *database management program.*

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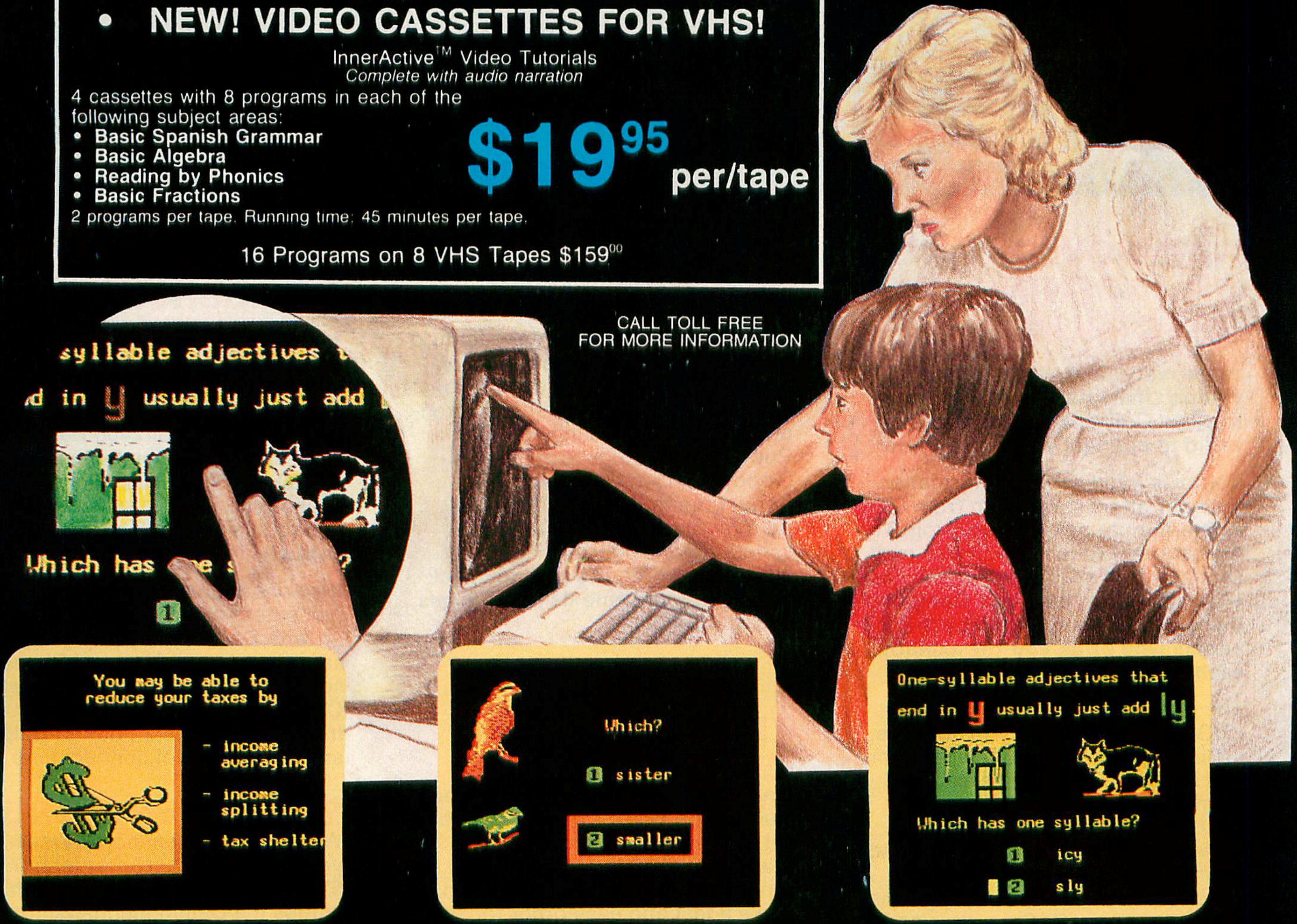

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First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $12 (U.S.) per hour.

On Telenet: The Uninet network has now merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call your local access number and make connection, press the ENTER key twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type `C DELPHI` and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $12 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Telenet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `RAINBOWSUB` and press ENTER. At the "PASSWORD:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `RAINBOWORDER` and press ENTER. At the "PASSWORD:" prompt, type `SENDSUB` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just press ENTER and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

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After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

B1 is on, blue will be on at medium intensity. The color number corresponding to Bit 3 on and all others off is 8. Both bits 1 and 4 may be on at the same time, in which case a high-intensity signal is sent to the monitor and the color number is 9.

We can now accurately predict the color of blue from its color number. Color 1 is dark blue, Color 8 is medium blue and Color 9 is bright blue.

An identical analysis can be made for green. Only Bit 1 on means dark green, whose color number is 2. Bit 4 on means medium green, whose color number is 16. Bright green results when both bits 1 and 4 are on and its number is 2 + 16, or 18. Red uses bits 2 and 5. Dark red is Color 4, medium red is Color 32, while bright red is Color 36. Thus the intensities of the pure colors, red, green and blue are defined. Color 0 is black (all colors off).

Of course any bits can be on at any time. The 64 colors encompass all possible combinations of bits on and off. At this point, readers with CM-8 monitors may want to type in the BASIC program at the end of the article. It is a CoCo 3 version of the lab experiment described in my physics book. But, instead of having projectors show intersecting circles of colored light on a screen, we will let the CoCo 3 generate the same experiment on the monitor. Again, this only works right on the CM-8 monitor. On a composite video monitor or TV there is no logic associated with the colors.

When you run the program, the display shown in Figure 1 is drawn on the screen with three intersecting primary color ovals with all three intensities set at high. To the left, the color numbers are displayed. To the lower left, intensities are displayed with an arrow pointing to an intensity number adjacent to one of the primary color names. Move the arrow by pressing any key except the numbers 0 to 3. The arrow steps down and then goes back to the top color. You can also press a number 0 to 3 to set the intensity for the primary color the arrow is pointing to. Zero turns the color off while 1, 2 and 3 correspond to dark, medium and bright.

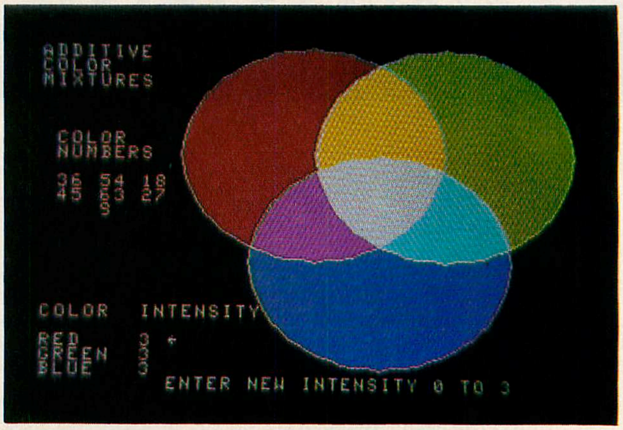
Moving on to color mixing, let's start with mixing bright colors. Bright red and bright green produce yellow. Bright red, green, blue and yellow comprise the first `PMODE 1` and `3` color set used in previous CoCos. The alternate color set is buff, cyan, magenta and orange. Buff is a mixture of bright red, bright green and bright blue. It is essentially white when the brightness of the TV or monitor is on full. Cyan is a mixture of bright green and bright blue with red off. Magenta is a mixture of bright blue and bright red. Thus, yellow, buff, cyan and magenta are the four colors resulting from mixing equal brightness pairs of primary colors and, with orange substituted for yellow, constitute the second set of `PMODE 3`. You can see these colors in the areas where the three ovals in Figure 1 intersect. Now the logic behind CoCo half-color selections is apparent. It only took me six years to discover it.

On a cold start, the CMP versions of these colors are stored in slots 0 to 7 of the palette. Black is in Slot 8. Those with CM-8 monitors should execute `PALETTE RGB` or include the command in their program if they want to have correct color graphics.

Mixing medium and dark primary colors produce medium and dark versions of the bright color mixtures. For example, buff goes to medium and dark gray. The dark mixtures would produce some nice dungeon or cave illustrations. Figure 2 illustrates the low-intensity primary colors and some of their mixtures. Figure 3 illustrates the generation of orange in the CoCo half-color set by mixing high-intensity red and low-intensity green.

This covers the simpler color mixtures. We discovered that there are three intensities for each of three primary colors resulting in nine separate colors. Each of these can make nine different two-color mixtures, producing a total of 27 two-color mixtures. Twenty-seven three-color mixtures are available and, adding black, all 64 possible colors are accounted for.

The program is divided into seven sections: lines 5 to 160 initialize and draw the screen, lines 200 to 240 get and process an input character, lines 300 to 390 process a red intensity change, lines 400 to 490 process a green intensity change, lines 500 to 590 process a blue intensity change, lines 600 to 690 update the color number display, and Line 1010 contains color number data for the various primary color intensity levels. This is read into the `IN(X,Y)` array.

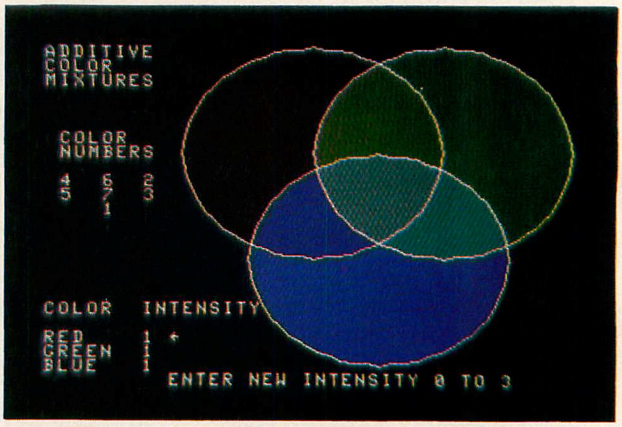


```
ADDITIVE
COLOR
MIXTURES

 COLOR
 NUMBERS
 36 54 18
 45 63 27
    9

COLOR   INTENSITY
RED       3 ←
GREEN     3
BLUE      3
            ENTER NEW INTENSITY 0 TO 3
```

Figure 1: High-intensity primary colors red, green and blue and their mixtures.

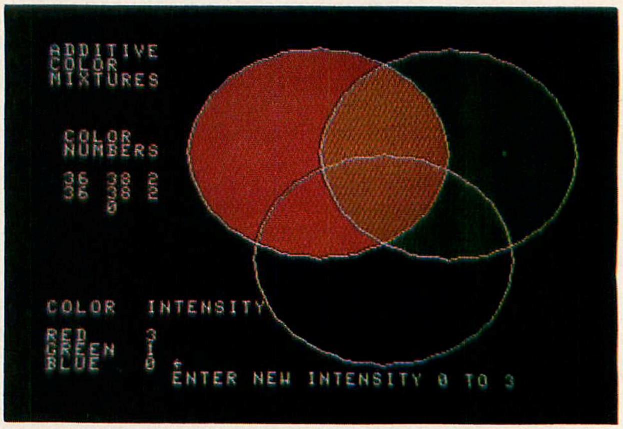


```
ADDITIVE
COLOR
MIXTURES

 COLOR
 NUMBERS
 4 6 2
 5 7 3
   1

COLOR   INTENSITY
RED       1 ←
GREEN     1
BLUE      1
            ENTER NEW INTENSITY 0 TO 3
```

Figure 2: Low-intensity primary colors and their mixtures.



```
ADDITIVE
COLOR
MIXTURES

 COLOR
 NUMBERS
 36 38 2
 36 38 2
    0

COLOR   INTENSITY
RED       3
GREEN     1
BLUE      0 ←
            ENTER NEW INTENSITY 0 TO 3
```

Figure 3: Mixing high-intensity red and low-intensity green produces orange. Blue is off.

Sugar Software

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CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, greeting cards, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon.* The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95.**

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Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #6** - (8 fonts) Block and Computer;

Economy Font Packages on disk; specify RSDOS or OS9; **29.95: Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk.

UTILITIES

Auto Run 64 - (Hybrid BASIC/ML) Utility to allow your own *tape-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Includes a graphics editor to create professional looking title screens. Tape only; 16K ECB; **$19.95.**

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TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95** (see combo pkg below).

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Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95.**

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level I); Ages 5-7 (level 2); Great graphics and music. Level 1: matching colors, shapes, letters and numbers; Level 2: association of letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95.**

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Enter up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); much more! Tape/Disk; **$19.95.**

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CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95.**

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All programs run on the CoCo I, II and III, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for postage and handling. Florida residents add 5% sales tax. COD orders add $4. Dealer inquiries invited.

In Line 5, a two-dimension array for the data from Line 1010 is created; the high-speed poke is made and the primary color intensity variables `RD`, `GN` and `BL` are initialized.

In Line 10, the RGB palette is established. The screen display includes three ovals that intersect in a way that produces seven specific areas. The outer portions of the ovals contain only the primary colors red, green and blue. Their colors are specified by the variables `RR` for red, `GG` for green and `BB` for blue. The values initially assigned, `36`, `18` and `9`, correspond to maximum intensity of all three colors.

The intersecting ovals define three sectors where two of the primary colors mix. The variables defining the colors in these sectors are `RG` for red and green, `GB` for green plus blue and `BR` for blue and red. The initial color numbers are `54`, `45` and `27`. These numbers are obtained simply by adding the color numbers of the two primary colors involved. Finally, there is the center sector where all three primary colors mix. Its variable is `AL` with the value `63`, initially.

In Line 20, `HCOLOR 11,8` defines the palette slots to be used for the foreground and background colors while `HSCREEN 2` displays the 320-by-192, 16-color graphics screen. In lines 30 and 40, two buffers are defined and filled with the current black screen color. When numbers printed on the screen are updated later, the program will retrieve black from these buffers to erase the previous numbers.

The three circles are drawn in Line 50. The numbers within the parentheses define the centers, the `80` sets the diameter as 80 dots while the `.75` defines the aspect ratio, causing the resulting figure to be an oval rather than a circle. I did this to maximize the size of each figure while leaving room for text on the screen. The circle color is not specified and defaults to the foreground color.

I noted before that the default palette contains the high-intensity three primary colors and their mixes. To paint the circle sectors we need only to specify the palette slot containing the desired color and specify Slot 11, which is the color of the sector outline where painting is to stop. The palette slot assignments are now fixed and color changes to a particular sector are made by changing the color assigned to its palette slot.

In Line 90, the color numbers relating to the various primary color intensities are read into the `IN(XY)` array. Lines 100 to 160 write the needed text onto the screen. About midway down the screen on the left side is a block of numbers displaying the current color numbers in each of the sectors. Since this needs updating each time colors are changed, it was put in a subroutine starting in Line 600.

The `HPUT` statement in Line 600 erases the currently displayed numbers and the `HPRINT` statements rewrite using the most current color numbers.

With the basic display complete, the program goes to Line 200 and looks for a keystroke. At this point, there is a left arrow pointing toward "red" in Line 20 near the bottom of the page. The current line of the arrow is held in variable `CL`. If a key other than the numbers 0 to 3 is pressed, `I$` is assigned a space that is detected in Line 210. Using the variable `CL` to establish arrow location, the `HPUT` statement in Line 210 erases the arrow. Then if the arrow was not on Line 22, it is moved down one line. If the arrow had been on Line 22, it would have been printed on Line 20. `CL` is updated accordingly.

When a number in the range 0 to 3 is entered, changes to the displayed colors are called for. The program uses `AP=CL-19` to get a 1, 2 or 3 in `AP` and moves to Line 230 to select the appropriate color change subroutine. An alternate to the `IF-THEN` statements in Line 230 is `ON AP GOSUB 300,400,500`. `ON-GOSUB` can be much faster and clearer when many options are involved.

The subroutine starting in Line 300 changes colors as the red intensity changes. Subroutines starting with lines 400 and 500 are nearly identical except that they are tailored to handle green and blue intensity changes. First the intensity number is recovered from `I$`. Next, the previous intensity shown at the bottom of the screen is erased and the new intensity printed. Then the color number for the new intensity is obtained from the array `IN(1,RD)`. Finally the new colors for the mixed-color sectors involved are calculated and palette slots changed accordingly. A call is made to `GOSUB 600` to update the color numbers on the screen and the program returns for the next keystroke. □

The listing: `CO3COLOR`

```
5 DIM IN(3,3):POKE65497,0:RD=3:G
N=3:BL=3
10 PALETTE RGB:RR=36:RG=54:GG=18
:BR=45:AL=63:GB=27:BB=9
20 HCOLOR11,8:HSCREEN2
30 HBUFF1,908:HGET(0,184)-(200,1
92),1
40 HBUFF2,98:HGET(0,0)-(20,8),2:
HBUFF3,1025 : HGET (0,72)-(80,96
),3
50 HCIRCLE(159,60),80,,.75:HCIRC
LE(239,60),80,,.75:HCIRCLE(199,1
20),80,,.75
60 HPAINT(120,60),3,11:HPAINT(20
0,40),1,11:HPAINT(260,60),0,11
70 HPAINT(160,100),6,11:HPAINT(2
00,100),4,11:HPAINT(240,100),5,1
1
80 HPAINT(200,120),2,11
90 FORX=1TO3:FORY=0TO3:READIN(X,
Y):NEXT Y,X
100 HPRINT(0,0),"ADDITIVE":HPRIN
T(0,1),"COLOR":HPRINT(0,2),"MIXT
URES"
110 HPRINT(1,6),"COLOR" : HPRINT
 (1,7),"NUMBERS" : GOSUB600
120 HPRINT(0,18),"COLOR  INTENSI
TY"
130 HPRINT(0,20),"RED        ":HPRI
NT(6,20),RD
140 HPRINT(0,21),"GREEN":HPRINT(
6,21),GN:HPRINT(0,22),"BLUE":HPR
INT(6,22),BL
150 CL=20:LA$=CHR$(95):HPRINT(9,
CL),LA$
160 HPRINT(9,23),"ENTER NEW INTE
NSITY 0 TO 3"
198 '
```

```
199 '
200 I$=INKEY$:IFI$=""THEN200 ELS
E IF ASC(I$)<48 OR ASC(I$)>51  T
HEN I$=" "
210 IF I$=" " THEN HPUT(70,CL*8-
1)-(90,CL*8+7),2,PSET:IF CL<22 T
HEN CL=CL+1 :HPRINT(9,CL),LA$:GO
TO200  ELSE CL=20:HPRINT(9,CL),L
A$:GOTO 200
220 AP=CL-19
230 IF AP=1 GOSUB 300 ELSE IF AP
=2 GOSUB 400 ELSEGOSUB 500
240 GOTO200
298 '
299 '
300 RD=VAL(I$):HPUT(50,CL*8-1)-(
70,CL*8+7),2,PSET:HPRINT(6,20),R
D
310 RR=IN(1,RD) : RG=RR+GG : BR=
RR+BB : AL=RR+GG+BB
320 PALETTE 3,RR:PALETTE 1,RG:PA
LETTE 6,BR:PALETTE 4,AL
330 GOSUB 600
390 RETURN
398 '
399 '
400 GN=VAL(I$):HPUT(50,CL*8-1)-(
70,CL*8+7),2,PSET:HPRINT(6,21),G
N
410 GG=IN(2,GN) : RG=RR+GG : GB=
GG+BB : AL=RR+GG+BB
420 PALETTE 0,GG : PALETTE 1,RG
: PALETTE 5,GB : PALETTE 4,AL
430 GOSUB 600
490 RETURN
498 '
499 '
500 BL=VAL(I$):HPUT(50,CL*8-1)-(
70,CL*8+7),2,PSET:HPRINT(6,22),B
L
510 BB=IN(3,BL) : BR=BB+RR : GB=
GG+BB : AL=RR+GG+BB
520 PALETTE 2,BB : PALETTE 6,BR
: PALETTE 5,GB : PALETTE 4,AL
530 GOSUB 600
590 RETURN
598 '
599 '
600 HPUT(0,72)-(80,96),3,PSET
610 HPRINT (0,9),RR : HPRINT (3,
9),RG : HPRINT (6,9),GG
620 HPRINT (0,10),BR : HPRINT (3
,10),AL : HPRINT (6,10),GB
630 HPRINT (3,11),BB
690 RETURN
1000 '
1010 DATA0,4,32,36,0,2,16,18,0,1
,8,9
```

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PIPELINE

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STATIC BATTLE Ohm/Electronics has provided an economical solution to the static problems that plague users of electronic equipment. With the introduction of the Scooter Model STP10 Anti-Static Touch Pad, both user and equipment are protected. The pad, which measures 2⅜ by 3¾ by ⅜ inch, mounts to any equipment or work surface with a pressure sensitive backing. The fully conductive front surface connects to 10 feet of cord that terminates with a banana plug and/or alligator clip for easy connection to any adjacent ground. The user simply touches the conductive pad before equipment operation for positive grounding between user and equipment. Scooter Anti-Static Touch Pads carry a suggested retail price of $12.95. *Contact Scooter Products, Ohm/Electronics, Inc., 746 Vermont Street, Palatine, IL 60067, (800) 323-2727; Illinois, call (312) 359-6040.*

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SALES UP Tandy Corporation has announced consolidated sales and operating revenues for the month of November were $336,135,000, an increase of 14 percent over the November 1985 sales and operating revenues of $294,737,000. Tandy's U.S. retail operations recorded a 17 percent gain in sales and operating revenues to $296,841,000 in November 1986, from $254,132,000 in November 1985. Sales and operating revenues of U.S. retail stores in existence more than one year increased 14 percent in November 1986.

DRIVE FOR THE BLUES J&M Systems, Ltd. of Albuquerque, N.M., has announced a new 3.5-inch floppy drive to upgrade existing 5.25-inch systems to the new industry standard at an affordable price. The system is designed for all IBM products and Compatibles. It is available as either an internal or external unit that is installed quickly and easily without special knowledge or tools. Internal units utilize the standard IBM floppy drive controller. External drives can be connected to any system that has a 37-pin connector. All drives include a copy of *ARC*, the acclaimed file compression and backup utility. The new J&M drives may be of interest to anyone wanting to upgrade a system, gain the increased storage available with a 3.5-inch disk or exchange information with other systems and portables. *Full information and prices are available from J&M Systems, Ltd., 15100-A Central S.E., Albuquerque, NM 87123, (505) 292-4182.*

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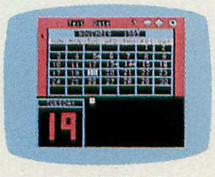
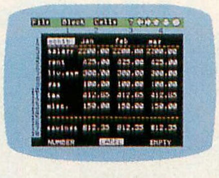

CALENDAR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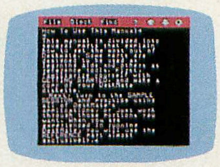
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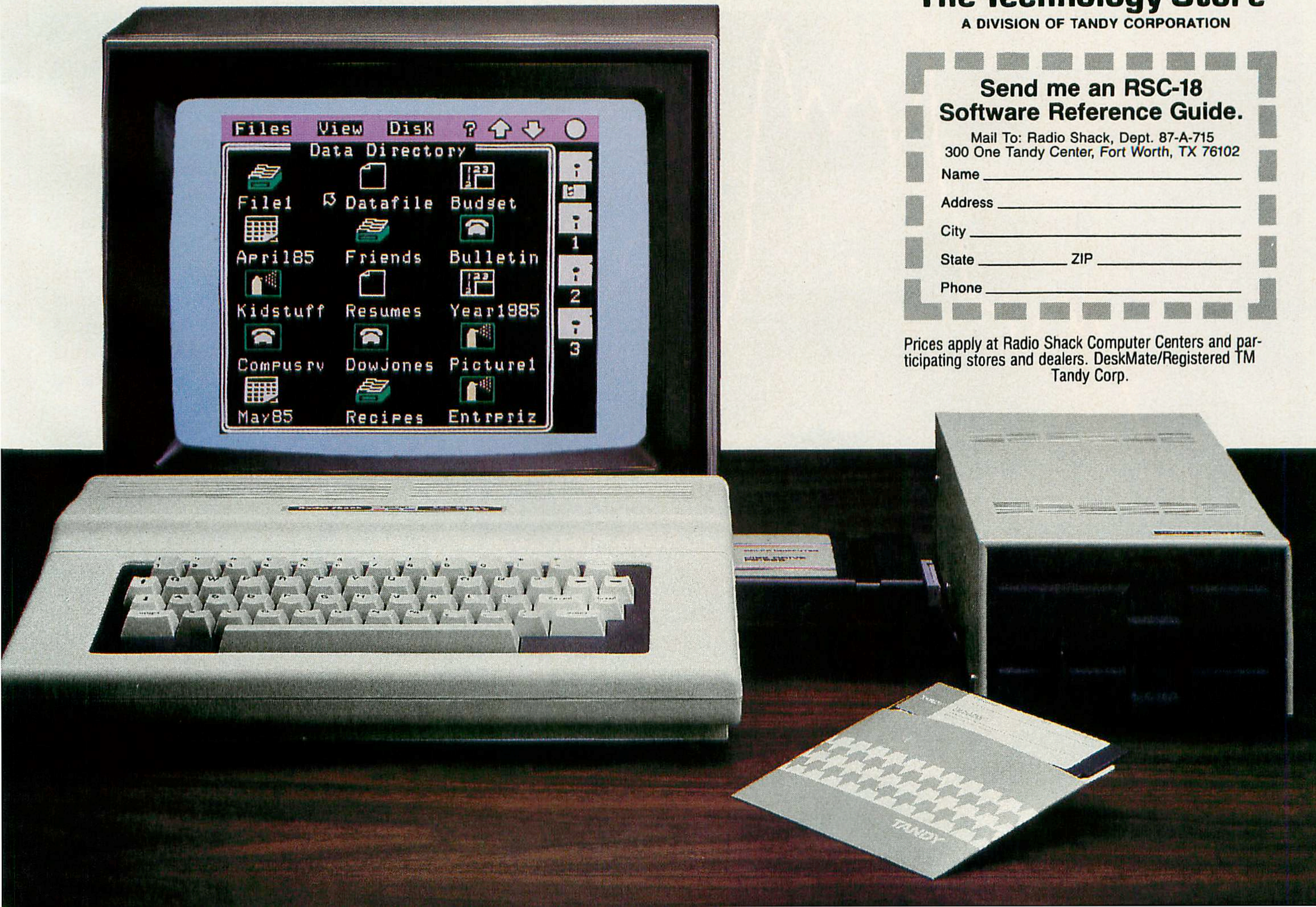


16K
ECB

See How Your Stocks Stack Up

By Mark Evans

Stock Tracker was developed to help me monitor the stock market. It allows the user to track the daily price of stocks. The user can print averages, highs and lows as well as stock prices. In addition, the accompanying *Graph* program (which uses the same data files as *Stock Tracker*) displays a graph of the 30-day moving average, stock prices and the year-to-date average.

Each file can track up to five stocks (mutual funds, indexes, etc.) for up to 130 days. *Stock Tracker* also allows the user to back up data. This is useful when starting a new tape after the first 130 days are up to preserve recent highs, lows and averages.

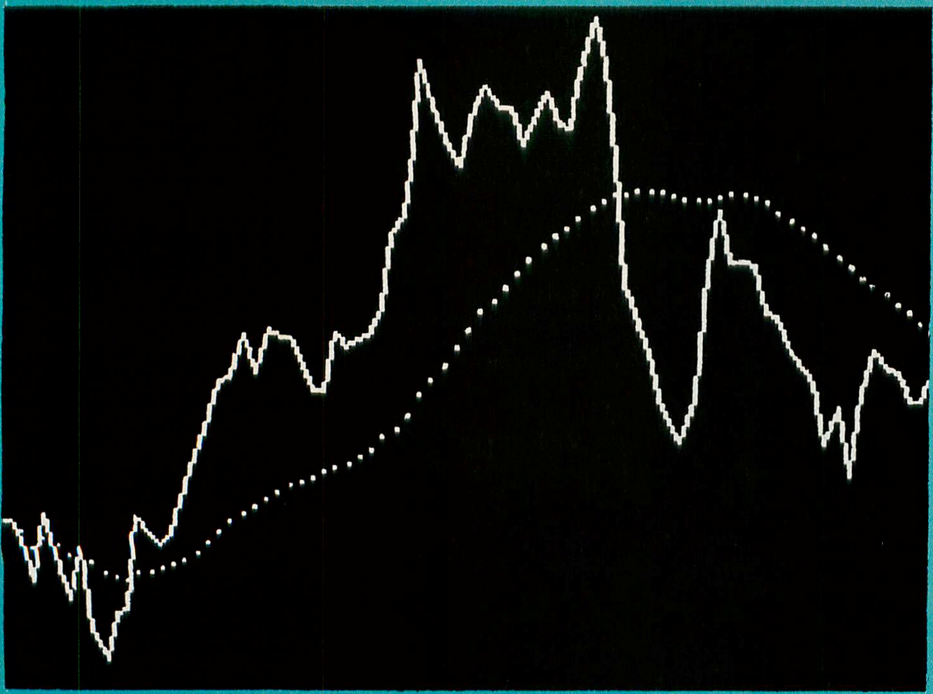
Programming techniques that may be of interest are found at various points in the programs. In *Stock Tracker*, lines of interest include:

36-42	Calculate the stock price highs, lows and average
69-77	Scroll the daily prices on the screen
92-94	Contain the routine to back up data
107-124	Contain a variable map

Of interest in the *Graph* program are lines 10 to 12, where the program graphs the stock price, calculates the most recent 30-day average and graphs this average. *Graph* adjusts the scales to ensure full use of the graphics page.

When keying in this program, especially on a 16K CoCo, it is important to type the lines just as they appear in the listing. Both *Stock Tracker* and *Graph* use all of the available memory on the 16K CoCo. Therefore, unnecessary spaces and lines can cause an Out of Memory Error. Note that lines 34 and 42 in *Stock Tracker* and lines 3, 6, 25 and 26 in *Graph* contain the high speed poke (`65495,0`). Delete this if it does not work on your computer.

(Questions about this program may be directed to the author at 2184 Coathbridge Drive, Germantown, TN 38138. Please enclose an SASE for a reply.) ☐



This graph depicts a certain stock's 30-day moving value (jagged line) along with its year-to-date average (dotted line). This helps the user get an overall picture of how well the stock is performing.

Mark Evans is a sophomore at Memphis State University where he is majoring in business and is a member of the Student Activities Council. He works with the youth group at Farmington Presbyterian Church and writes computer programs in his spare time.

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49	205
58	219
67	85
84	164
96	221
END	100

Listing 1: STOCK

```
0 CLS0:PRINT@138,"STOCK TRACKER"
;:PRINT@138+32,"BY MARK EVANS";:
PRINT@136+96,"COPYRIGHT (C)  198
6";:FORX=1TO2000:NEXT:CLS:PRINT@
96,"THIS PROGRAM IS DESIGNED TO
AID IN THE TRACKING OF STOCK PRI
CES.IT IS not CLAIMED AS A METHO
D"
1 PRINT"OF INVESTING IN STOCKS.
FURTHER,THE AUTHOR IS not RESPON
SIBLE   FOR THE OUTCOME FROM ERR
ONEOUS  CALCULATIONS RESULTING F
ROM THISPROGRAM.":FORX=1TO10000:
NEXT
2 '
3 '             STOCK TRACKER
4 '
5 'COPYRIGHT(C) 1986,MARK EVANS
6 '
7 '
8 '
9 '
10 '
11 '
12 PCLEAR1:CLEAR1400:DIMS(5,130)
,D$(130)
13 CLS3:PRINT"1. DAILY ENTER SEQ
UENCE":PRINT"2. SAVE DATA":PRINT
"3. PRINT OPTIONS":PRINT"4. CREA
TE FILES":PRINT"5. LOAD DATA":PR
INT"6. END PROGRAM"
14 PRINT"ENTER SELECTION...";
15 R$=INKEY$:IFR$="1"THEN17ELSEI
FR$="2"THEN79ELSEIFR$="3"THEN34E
LSEIFR$="4"THEN85ELSEIFR$="5"THE
NGOTO18ELSEIFR$="6"THENCLS0:END
16 GOTO15
17 PT$="DAILY ENTER SEQUENCE..."
:GOSUB19:GOTO25
18 PT$="LOAD DATA...":GOSUB19:GO
TO13
```

CoCo Cat
Says
Drugs Are
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```
19 CLS0:PRINTPT$;:PRINT@64,"";:I
NPUT"ENTER NAME OF STOCK DATA FI
LE ";DN$:PRINT@128,"PRESS PLAY O
N TAPE RECORDER...  PRESS <SPACE
BAR> WHEN READY...";
20 R$=INKEY$:IFR$=" "THEN21ELSE2
0
21 ' LOAD DATA
22 OPEN"I",-1,DN$
23 INPUT#-1,NE:FORQ=1TO5:INPUT#-
1,S$(Q):NEXT:FORW=1TONE:INPUT#-1
,D$(W),S(1,W),S(2,W),S(3,W),S(4,
W),S(5,W):NEXT:CLOSE(-1)
24 RETURN
25 'DATA ENTRY
26 CLS:NE=NE+1:INPUT"DATE(MM/DD/
YY)";D$(NE):GOSUB95:CLS:PRINT@0,
D$(NE):FOR S=1TO5:PRINT@32*(S+1)
,USING"%              %";S$(S),
:PRINT"PRICE";:INPUTS(S,NE):NEXT
27 PRINT@32*12:PRINT"ANY CORRECT
IONS(Y/N)?";
28 R$=INKEY$:IFR$="Y"THENPRINT:I
NPUT"WHICH NUMBER(1-5)";N:PRINTS
$(N),:PRINT"PRICE";:INPUTS(N,NE)
:CLS0:PRINTD$(NE):FORS=1TO5:PRIN
TS$(S),S(S,NE):NEXT:GOTO27
29 IFR$=""THEN28
30 CLS0:PRINT"REWIND DATA TAPE..
.             PRESS RECORD AND P
LAY...        PRESS ENTER WHEN R
EADY..."
31 R$=INKEY$:IFR$=CHR$(13)THENGO
SUB80ELSE31
32 CLS0:PRINT"DATA HAS BEEN SAVE
D...          PRESS ANY KEY TO R
ETURN TO MENU.ALL DAILY ENTRY FU
NCTIONS ARE   COMPLETE."
33 R$=INKEY$:IFR$=""THEN33ELSE13
34 IF TT=9187 THEN 43 ELSE TT=91
87:POKE65495,0:FORW=1TO5:T(W)=0:
NEXT
35 CLS0:PRINT"PLEASE STANDBY..."
36 ZA=0:FORQ=1TO5:HP(Q)=0:LP(Q)=
5000:FORW=1TONE:ZA=ZA+1
37 T(Q)=T(Q)+S(Q,W)
38 PRINT@25,USING"######";5*NE-Z
A
39 IF S(Q,W)>HP(Q)THEN HP(Q)=S(Q
,W)
40 IF S(Q,W)<LP(Q)THEN LP(Q)=S(Q
,W)
41 NEXT:NEXT
42 FORQ=1TO5:AP(Q)=T(Q)/NE:NEXT:
POKE65494,0
43 CLS0:PRINT"1. GENERAL INFORMA
TION          2. DAILY PRICES
                3. RETURN TO MENU"
44 R$=INKEY$:IFR$="3"THEN13ELSEI
FR$="1"THEN45ELSEIFR$="2"THEN58E
LSE44
45 CLS0:INPUT"PRINT TO:1. SCREEN
                       2. PRINTE
R             ";EW:IFEW=1THEN46E
LSEIFEW=2THEN53ELSE45
46 WQ=1
47 CLS0:PRINT@0,USING"%
    %                 CURRENT PR
ICE: $####.##           DATE: %
    %
                      YEAR AVERA
GE: $####.##          YEAR HIGH:
 $####.##";S$(WQ),S(WQ,NE),D$(NE
),AP(WQ),HP(WQ)
48 PRINTUSING"YEAR LOW:  $####.#
#";LP(WQ):PRINT"----------------
----------------";
49 PRINT"PRESS <^> TO ADVANCE AN
D <DOWN  ARROW> TO REVIEW.
         PRESS <ENTER> TO END SE
QUENCE."
50 R$=INKEY$:IFR$="^"THENWQ=WQ+1
ELSEIFR$=CHR$(10)THENWQ=WQ-1ELSE
IFR$=CHR$(13)THEN34ELSE50
51 IF WQ>5THENWQ=5:SOUND 200,2 E
LSE IF WQ<1THENWQ=1:SOUND1,1
52 GOTO47
53 CLS0:PRINT"TURN PRINTER ON AN
D POSITION    PAPER...   PRESS <E
NTER>..."
54 R$=INKEY$:IFR$=CHR$(13)THEN55
ELSE54
55 PRINT#-2,TAB(35);"STOCK DATA"
:PRINT#-2,STRING$(80,"-"):PRINT#
-2,"STOCK";TAB(20);"DATE";TAB(30
);"CUR. PRICE";TAB(45);"YEAR MEA
N";TAB(60);"YEAR HIGH / LOW":PR
INT#-2,STRING$(80,"-")
56 FOR QQ=1 TO 5:PRINT #-2,USING
"%               %   %        %
 $####.##      $####.##      $##
##.##   $####.##";S$(QQ),D$(NE),
S(QQ,NE),AP(QQ),HP(QQ),LP(QQ):NE
XT
57 PRINT#-2,STRING$(80,"-"):GOTO
34
58 CLS0:PRINTUSING"1. %
       %           2. %
       %           3. %
       %           4. %
       %           5. %
       %";S$(1),S$(2),S$(3),S$(4
),S$(5)
59 PRINT@32*6,"MAKE SELECTION AS
 TO WHICH YOU  WANT DAILY PRICES
 ON.  PRESS    <ENTER> TO RETURN
 TO MENU."
60 WQ$=INKEY$:IFWQ$=CHR$(13)THEN
```

```
34ELSEIFVAL(WQ$)>=1AND VAL(WQ$)<
=5 THEN 61 ELSE 60
61 CLS0:KK=VAL(WQ$):PRINT"WHERE
DO YOU WANT DATA PRINTED.
1. SCREEN OR
2. PRINTER"
62 RR$=INKEY$:IFRR$="1"THEN D=0
ELSE IF RR$="2"THEND=-2 ELSE 62
63 CLS0:PRINT"PRESS ENTER WHEN R
EADY TO PRINT DATA."
64 R$=INKEY$:IFR$=CHR$(13)THEN66
ELSE64
65 S(KK,0)=S(KK,1)
66 IF D=-2 THEN PRINT#-2,CHR$(15
)
67 IFD=-2THENPRINT#-2,USING"DAIL
Y STOCK QUOTES FOR %           %
";S$(KK):PRINT#-2,CHR$(14):PRINT
#-2,"DATE";TAB(18);"PRICE":PRINT
#-2,STRING$(40,"-"):FORPP=1TONE:
H=S(KK,PP)-S(KK,PP-1):PRINT#-2,U
SING"%       %      $####.### +
####.###";D$(PP),S(KK,PP),H
68 IF D=-2THENNEXT:GOTO34
69 FOR A=1TO NE STEP14
70 CLS
71 IF NE-A>14THEN QQ=A+14 ELSE Q
Q=NE
72 FORAA=A TO QQ:PRINTUSING"%
   %  $####.### +####.###";D$(A
A),S(KK,AA),S(KK,AA)-S(KK,AA-1):
NEXT
73 PRINT@32*15,"PRESS <SPACEBAR>
 TO CONTINUE.";
74 R$=INKEY$:IFR$=" "THEN75ELSE7
4
75 NEXTA
76 PRINT@32*15,"PRESS A KEY TO R
ETURN TO MENU.";
77 R$=INKEY$:IFR$=""THEN77ELSE34
78 GOTO78
79 CLS0:INPUT"REWIND DATA TAPE..
.             PRESS RECORD AND P
LAY...        PRESS ENTER WHEN R
EADY...       ";EE$:GOSUB80:GOTO
13
80 MOTORON:FORX=1TO2500:NEXT:OPE
N"O",-1,DN$
81 PRINT#-1,NE
82 FORQ=1TO5:PRINT#-1,S$(Q):NEXT
:FORW=1TONE:PRINT#-1,D$(W),S(1,W
),S(2,W),S(3,W),S(4,W),S(5,W):NE
XT
83 CLOSE(-1)
84 RETURN
85 CLS:PRINT"1 CREATE NEW FILE":
PRINT"2 BACKUP FILE":PRINT"3 RET
URN TO MAIN MENU"
86 R$=INKEY$:IFR$="1"THEN87ELSEI
FR$="2"THEN92ELSEIFR$="3"THEN13E
LSE86
87 INPUT"ENTER FILENAME";DN$:CLS
0
88 PRINT"ENTER THE NAMES OF 5 ST
OCKS TO BE TRACKED:"
89 PRINT@64,"";:FORX=1TO5:PRINTU
SING"STOCK #";X;:INPUTS$(X):NEXT
90 CLS0:FORX=1TO5:PRINTS$(X):NEX
T:PRINT@32*11,"ARE THESE CORRECT
(Y/N)?";
91 R$=INKEY$:IFR$=""THEN91ELSEIF
R$="N"THEN85ELSEIFR$="Y"THEN79
92 CLS:INPUT"HOW MANY DAYS BACK
DO YOU WANT  TO SAVE";BD:IF BD>N
E OR BD<1 OR BD<>INT(BD) THEN 92
ELSECLS0:INPUT"FILE NAME";DN$:DN
$=MID$(DN$,1,8)
93 PRINT@96,"";:PRINT"PRESS PLAY
 AND RECORD. PRESS     <ENTER>";:
LINEINPUTR$:MOTORON:FORX=1TO2500
:NEXT:MOTOROFF:OPEN"O",-1,DN$:PR
INT#-1,BD:FORX=1TO5:PRINT#-1,S$(
X):NEXT:FORQ=BD TO1STEP-1:NB=1+N
E-Q:PRINT#-1,D$(NB),S(1,NB),S(2,
NB),S(3,NB),S(4,NB),S(5,NB)
94 NEXT:CLOSE:GOTO13
95 IF LEN(D$(NE))<>8THEN105
96 FORQ=1TO8:E$(Q)=MID$(D$(NE),Q
,1):NEXT
97 IF E$(3)="/"ANDE$(6)="/"THEN9
8ELSE105
98 IF E$(1)="1"ORE$(1)="0"THEN99
ELSE105
99 E=ASC(E$(2)):IFE>=48AND E<=57
 THEN100ELSE105
100 FORW=4TO5:E=ASC(E$(W)):IFE>=
48ANDE<=57THEN101ELSE105
101 NEXT
102 IF E$(7)="8"ORE$(7)="9"THEN1
03ELSE105
103 E=ASC(E$(8)):IFE>=48ANDE<=57
 THEN 104 ELSE 105
104 RETURN
105 PRINT"ENTER DATE IN FORMAT
MM/DD/YY.":INPUTD$(NE):GOTO95
106 '     VARIABLES:
107 ' D$(X)=DATE      R$=INKEY$
108 ' S(X,Y)=STOCK PRICE FOR
109 '        STOCK X, DATE Y
110 ' S$(X)=STOCK NAME
111 ' DN$=DATA FILE NAME
112 ' NE=NUMBER OF ENTERIES
113 ' HP(X)=HIGH PRICE       FOR
114 ' LP(X)=LOW PRICE    STOCK X
115 ' T(X)=TOTAL OF STOCK
116 '      PRICES FOR STOCK X
117 ' AP(X)=AVERAGE PRICE FOR
118 '      STOCK X
```

```
119 ' LINES 500-680:D=PRINT
120 '               DEVICE
121 '             KK=STOCK #
122 ' BN= # OF ENTERIES BACK TO
123 '    BE USED IN DATA BACKUP
```

Listing 2: GRAPH

```
0 ' STOCK TRACKER GRAPH PROGRAM
1 'COPYRIGHT(C), 1986 MARK EVANS
2 PCLEAR4:PMODE4,1:PCLS:CLEAR120
0:DIMS(5,130),D$(130):CLS0:INPUT
"ENTER FILENAME";DN$:PRINT@96,"P
RESS PLAY AND <ENTER> TO LOAD  D
ATA FROM TAPE.":LINEINPUTR$:R$="
":DN$=MID$(DN$,1,8)
3 OPEN"I",-1,DN$:INPUT#-1,NE:FOR
Q=1TO5:INPUT#-1,S$(Q):NEXT:FORW=
1TONE:INPUT#-1,D$(W),S(1,W),S(2,
W),S(3,W),S(4,W),S(5,W):NEXT:CLO
SE(-1):POKE65495,0:FORW=1TO5:T(W
)=0:NEXT:PRINT@448,"PLEASE STAND
BY"
4 FORQ=1TO5:HP(Q)=0:LP(Q)=5000:F
ORW=1TONE:T(Q)=T(Q)+S(Q,W):IFS(Q
,W)>HP(Q) THENHP(Q)=S(Q,W)
5 IFS(Q,W)<LP(Q)THENLP(Q)=S(Q,W)
6 NEXT:AP(Q)=T(Q)/NE:NEXT:POKE65
494,0
7 MA=0:MT=0:CLS0:PRINT"ENTER NUM
BER TO BE GRAPHED":FORQ=1TO5:PRI
NTUSING"# ";Q;:PRINTS$(Q):NEXT
8 R$=INKEY$:S=VAL(R$):IFS>0ANDS<
6THEN9ELSE8
9 SC=180/(HP(S)-LP(S)):MP(S)=(HP
(S)+LP(S))/2:DS=256/NE:SCREEN1,1
:LINE-(0,96+(MP(S)-S(S,1))*SC),P
RESET
10 FORD=1TONE:IFD<=30THENMT=MT+S
(S,D):MA=MT/D
11 IFD>30THENMT=MT+S(S,D)-S(S,D-
30):MA=MT/30
12 PSET(DS*D,96+(MP(S)-MA)*SC):L
INE-(DS*D,96+(MP(S)-S(S,D))*SC),
PSET:PSET(DS*D,192):PSET(DS*D,19
1):NEXT
13 SCREEN1,1:R$=INKEY$:IF R$=""T
HEN13
14 CLS:PRINT"ENTER SELECTION:":P
RINT"1 DAY GRID":PRINTUSING"2 AV
ERAGE PRICE ($####.###)";AP(S):P
RINT"3 HIGHLIGHT A DAY":PRINT"4
CLEAR SCREEN":PRINT"5 GRAPH ANOT
HER STOCK":PRINT"6 VIEW GRAPH":P
RINT"7 HORIZONTAL PRICE LINES":P
RINT"8 END PROGRAM"
15 R$=INKEY$:IFR$="4"THENPCLS:GO
TO13ELSEIFR$="6"THEN13ELSEIFR$="
2"THEN25ELSEIFR$="5"THENGOTO7ELS
EIFR$="1"THEN21ELSEIFR$="3"THEN1
6ELSEIFR$="8"THENENDELSEIFR$="7"
AND(HP(S)-LP(S))>1THENGOTO23ELSE
IFR$="7"THENPRINT"INTERVAL TOO S
MALL":GOTO15ELSEGOTO15
16 CLS:PRINT"USE THE UP AND DOWN
 ARROW TO     SCROLL THROUGH THE
DATES. PRESS ENTER TO HIGHLIGHT
THE DATE      BEING VIEWED.":QW=1
17 R$=INKEY$:IFR$=CHR$(10)THENQW
=QW-1ELSEIFR$="^"THENQW=QW+1
18 IF QW<1THENSOUND1,1:QW=1ELSEI
F QW>NE THENSOUND255,1:QW=NE
19 IFR$=CHR$(13)THENLINE(DS*QW,0
)-(DS*QW,196),PSET:GOTO13
20 PRINT@164,USING"%          %";D
$(QW):GOTO17
21 CLS0:INPUT"ENTER INVERVAL FOR
 GRIDS, ENTER <1> FOR A GRID FOR
 EACH DAY";GI:IF GI>NE THENPRINT
"INTERVAL TOO GREAT, ENTER AGAIN
";ELSEIF GI<1THENPRINT"INTERVAL
MUST BE GREATER THEN 0":FORWQ=1T
O3000:NEXT:GOTO21
22 FORX=1TO NE*DS STEP GI*DS:LIN
E(X,0)-(X,255),PSET:NEXT:GOTO13
23 I=INT((HP(S)-LP(S))/20):GOSUB
24:CLS:PRINTUSING"$##.#INCREMENT
S";I:FORXY=INT(LP(S)+1)TOINT(HP(
S))STEPI:LINE(0,96+(MP(S)-XY)*SC
)-(255,96+(MP(S)-XY)*SC),PSET:NE
XT:GOTO13
24 IFI<1THENI=1:RETURNELSERETURN
25 POKE65495,0:YP=96+(MP(S)-AP(S
))*SC:FORP=0TO255:IFPPOINT(P,YP)
=5THENC=0ELSEC=5
26 PSET(P,YP,C):NEXT:POKE65494,0
:GOTO13
```

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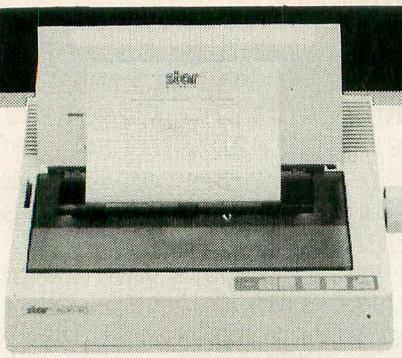

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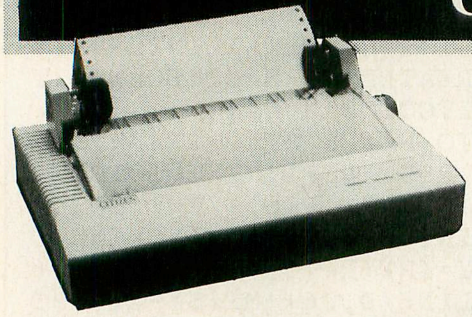

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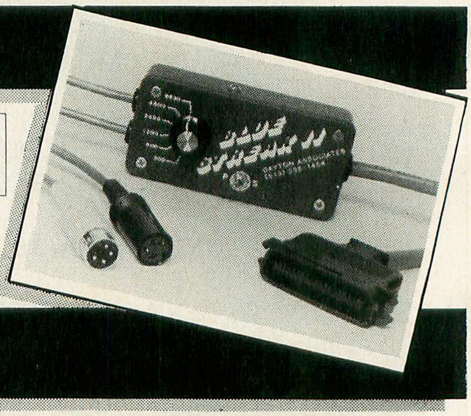

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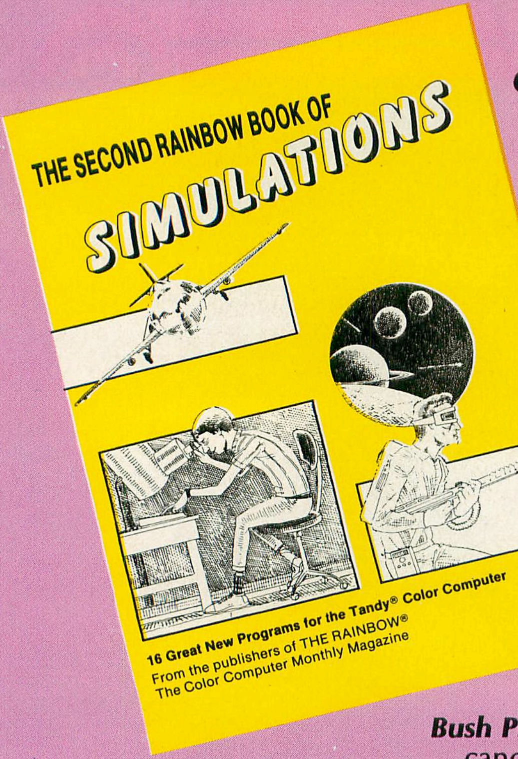
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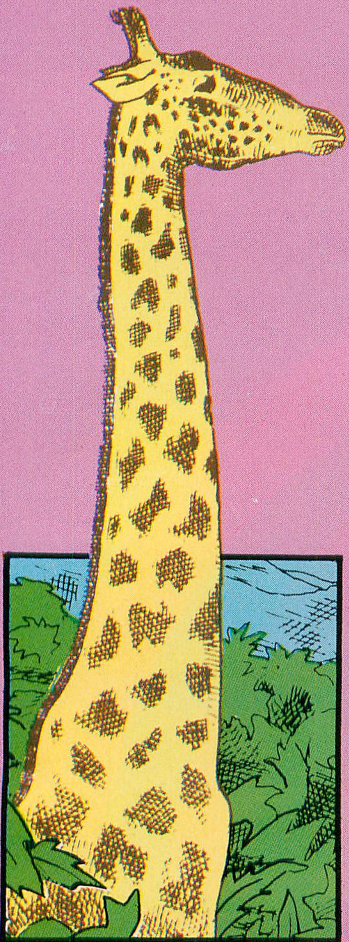

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REVIEWING REVIEWS

Wall Street

Editor:

I would like to thank Patricia Arrington for her review of *Wall Street* (October 1986, Page 137). The review was excellent, except for one omission. The instructions to the program did not mention that *Wall Street* is also available on disk; however, a disk version is available for $6.

Andre Needham
Drayon Software

Bob van der Poel Software

Editor:

In the November '86 issue of THE RAINBOW two of my products were reviewed; I would like to make a couple of additional comments.

Ultra Telepatch (Page 138) is completely compatible with the CoCo 3. Also, it is mentioned that the copy reviewed was Version 3.0. This was a misprint in the documentation — the copy reviewed was 1.0; we're now shipping release 2.0.

The review of *Lister* (Page 139) mentions some problems with baud rates: ". . . the program assumes you are using . . . 600 baud." Actually, it uses the standard outputs provided by BASIC, and the user can set these to any rate he wants (`POKE 150, xx` just like you do with any other program). Since this program was submitted for review, I have received my CoCo 3. Because of the method used by Microware to add the new tokens to BASIC, I found that *Lister* would not handle these tokens properly. A new version is now being shipped that handles the CoCo 3's tokens (it works with the CoCo 1 and 2 as well).

In the same issue you had a letter from Graham Langford in which he complained about a problem with *Penpal.* I am not associated in any way with Four Star Software; but the complaint Mr. Langford had is similar to one I received from one of my *Ultra Telepatch* customers — that of intermittent extra characters appearing, usually @'s and h's [see the letter from Paul Cundle, Page 8]. I have been unable to duplicate the problem. I've tried the "defective" version on at least 10 other computers and found it to work fine on every one. My guess is that my customer and Mr. Langford both have a hardware problem with their computers. I suspect a slow or flaky PIA. If any other users have experienced similar problems with *Ultra Telepatch*, or any other program, and have come up with a fix, I'd really like to hear from them.

Bob van der Poel
Edmonton, Alberta

Lyra

Editor:

It was with some interest that I read the review of *Lyra* by Speech Systems in the December RAINBOW. After extensive use of the *Lyra* demo, I feel obliged to comment on the problems with *Lyra* that the reviewer passed off with, "I am told that we can expect the works on this package as well." Unfortunately, this just isn't the case!

I have been a choir director, soloist and composer for 20 years in the U.S. and Europe and have found some shortcomings with *Lyra* which preclude really serious work with it.

First, when successive notes have the same pitch, they sound as one long note, and the only way to break them up is to shorten the notes and add rests. In part singing and accompaniment this is unacceptable, and I can't imagine composing this way.

Secondly, a new or additional voice (a fifth note in a chord, for example) can be added to the music only if it is preceded from the beginning of the music with rests in every measure until it is sounded. Thus, if a fuller chord is desired in Measure 27, rests must be added as place holders for this voice in measures 1-26.

Yes, there are eight voices, but for normal composition where varied chord size is more the rule than the exception, trying to use them is extremely unwieldy. And the inability to change volume or tempo within *Lyra* relegates it to a position below *Musica* in my opinion.

I contacted Speech Systems concerning these problems and was informed that *Lyra* was intentionally written the way it is now, and no correction to my two major objections will be forthcoming. I hope the attitude of Speech Systems wasn't truly represented by the young man I talked to on the phone. Their products are good and fill a need in the CoCo software market.

Lawrence A. Reed
Peoria, AZ

Editor's Note:

The review of Lyra was done by our technical editor, Cray Augsburg, who also has a background in music. We asked him to read your letter and would like to share his comments with you.

"The reason the notes sound as one long note when short notes of the same pitch are tied together is because Lyra *does not support any form of envelope control. This is true of all Speech Systems' music programs except* Symphony 12. *To get around this, you must enter a note of shorter duration and fill the space with a rest. This is not a major fault, rather an inconvenience.*

"The Color Computer does have a slow clock speed by today's standards. It is also relatively small in the memory department. Because of this, and because of the complex nature of Lyra, *rests are required to precede voices that do not appear until later. Again, this is an inconvenience I can live with.*

*"*Musica *and* Musica 2 *went through several revisions, so let's give Speech Systems a chance to feature-pack* Lyra.*"*

RECEIVED & CERTIFIED

The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

This month the Seal of Certification *has been issued to:*

Blackout Bingo Game, a program to assist the player in winning TV Bingo. Let CoCo play over 100 cards while you watch the game on television. CoCo 3 compatible. *R.E. Powell, 309 Foster Street, Greensburg, PA 15601; tape only, $19.95 plus $2 S/H.*

Datapack II Plus, a 32K terminal program requiring one disk drive. This program allows you to communicate with other computers and computer information services at rates varying from 300 to 9600 baud. Features include Hi-Res screen and 80-column displays, built-in buffer editor, programmable key buffers and Auto-Log files, and supports RS-232 hardware. *Cer-COMP, 5566 Ricochet Avenue, Las Vegas, NV 89110; (702) 452-0632, $59.95.*

Dragon's Castle, a 32K Adventure game. The fire-breathing dragon has attacked the castle of your king. He has killed everybody except the beautiful princess. Your mission is to save the princess and destroy the dragon using weapons and magic spells you find along the way. CoCo 3 compatible. *Mitchell Software, P.O. Box 194, Tomahawk, WI 54487; (715) 453-4204, $14.95 plus $1.50 S/H.*

Elite*Word/80, Color Computer 3 word processing program. Includes 40/80-column display, onscreen command line, wide range of control keys for text editing and file manipulation. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, $79.95 plus $3 S/H.*

Lockout, a 16K Disk ECB utility. Create your own passwords to protect your disks. Compatible with CoCo 3. *Custom Software, Box 42, Long Lane, MO 65590; (417) 345-8163, $15 plus $1.25 S/H.*

Mega Sound, a software/hardware device designed to assist in recording actual voice, music or any other sound you want into your computer's memory. Requires standard audio source and one disk drive. *Lucas Industries 2000, 14720 Cedar Street NE, Alliance, OH 44601; (216) 823-4221, $49 plus $2.50 S/H.*

Sigmaword, word processor designed for a 32K disk system. Features include onscreen line and character counters, full-screen editing, justified display and printing, disk I/O, and is menu-driven. The program can also be customized. *Sigma Software, 14024 152nd Avenue SE, Renton, WA 98056; $9.95.*

State the Facts Game, a 64K educational program that requires one disk drive. This geography game helps players learn the states and capitals, and provides interesting facts about individual states. *Mikaron Software Company, P.O. Box 1064, Chester, CA 96020; $22.95 plus $.50 S/H.*

Survey Programs, 32K ECB programs for surveyors. Package includes three "traverse" routines. Field Traverse accepts field data. Bearings, included/excluded angles and deflection angles are processed, and distances can be corrected for slope and temperature. Map Check accepts bearings and distances only, and the distances cannot be corrected. The third routine is included with the Coordinate Geometry programs. It accepts bearings and distances only, and no adjustments are available. *TP Jones, 2338 Ryder Street, Ottawa, Ontario, Canada K1H 6X6; $119; $159 Cnd.*

Title, a 32K disk utility. Choose background and character colors, and print large titles on the screen. This program also lets you create subroutines that can be merged into BASIC programs. *B. Erickson Software, P.O. Box 11099, Chicago, IL 60611; (312) 276-9712, $30.*

Ultra Editor, a 128K CoCo 3, full-screen line editor. Features include Find, Change and Jump commands, block transfers and macros. The program has two buffers: a 50K-plus main buffer and a 16K secondary buffer. Both disk and cassette I/O are supported. *CMD Micro Computer Services Ltd., 10477 124th Street, Edmonton, Alberta, Canada T6M 1E1; $19.95 plus $2 S/H.*

Wild West, a 128K CoCo 3 Adventure that requires one disk drive. Get out your six-shooter and polish your spurs! Journey into the land of the old west. As sheriff of Dry Gulch your job is to keep the peace, but Black Bart has escaped from jail and is on his way to recover his hidden fortune. Can you set a trap to capture Black Bart? Or will he get you? *Tom Mix Software, P.O. Box 201, Ada, MI 49301; (616) 676-8172, $25.95.*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

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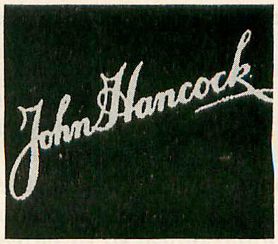

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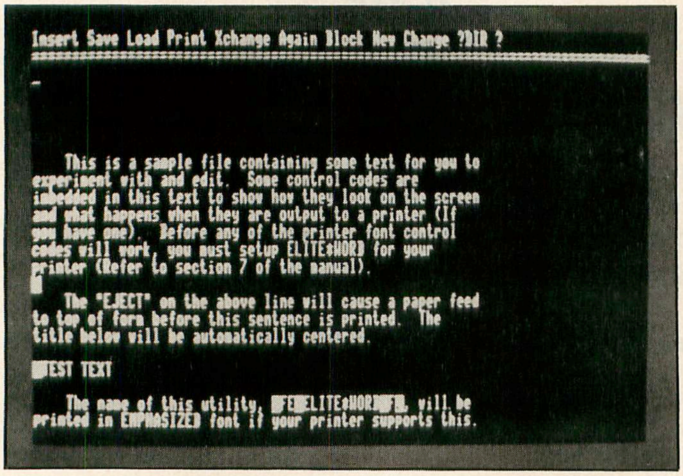
*Elite*Word/80* Offers Superior Word Processing for CoCo 3

*Elite*Word/80* is a third-generation word processing program for the Color Computer 3. This third revision builds on the many popular features of the previous versions and provides both 40- and 80-column text displays. This program will *not* work on either the CoCo 1 or 2; only the CoCo 3. Furthermore, the 80-column text display can only be appreciated on an RGB or monochrome composite monitor. I used it on my Tandy CM-8 RGB monitor, as well as on an NAP monochrome composite monitor and an Amdek color composite monitor. The 80-column text display was beautiful on the RGB and monochrome monitors but horrible on the color composite monitor. In the 40-column mode, the text was fine on all three monitors.

The program is supplied on disk and contains a BASIC driver in addition to the main machine language program. A test file is also provided on the disk and is used as a tutorial on how the commands work. This gives you the chance to actually try the various commands and functions right on the screen. Also included on the disk is a program called Setup. This BASIC program can be used to start the program with default values of your choice, such as screen width, disk drive number, upper- and lowercase, printer fonts and baud rate, etc. The disk is not copy-protected, so a backup for your own use is recommended.



```
Insert Save Load Print Xchange Again Block New Change ?DIR ?
================================================================================
-



    This is a sample file containing some text for you to
experiment with and edit.  Some control codes are
imbedded in this text to show how they look on the screen
and what happens when they are output to a printer (If
you have one).  Before any of the printer font control
codes will work, you must setup ELITE*WORD for your
printer (Refer to section 7 of the manual).
█
    The "EJECT" on the above line will cause a paper feed
to top of form before this sentence is printed.  The
title below will be automatically centered.

█EST TEXT

    The name of this utility, F1ELITE*WORDF1, will be
printed in EMPHASIZED font if your printer supports this.
```

I found *Elite*Word/80* to be very user-friendly. I'm an old *Telewriter-64* fan, but I can tell you that *Elite*Word* is easier to learn and use. I was impressed with its overall speed and smoothness of operation. My one dislike is that the program does not feature audible key-clicks. I've grown to like this feature on my many-patched version of *Telewriter*. Somehow, the sound and rhythm of the "clicks" seem to make me a better typist. What the heck, this program has so many great features, what's wrong with a simple little key-click option?

The start-up screen on the RGB monitor is black with white letters. The command line at the top of the screen can be changed by pressing ENTER to advance to the next set of commands. You never have to leave the text screen to execute commands from the main menu.

One of the main menu options, the Insert (I) mode, displays current status information consisting of Insert, K Free, Column Location and U/L Case.

"... destined to become a new standard in word processing for the Color Computer 3."

Insert reminds you that you are in the typing or editing mode. K Free indicates the space free in the text buffer in thousands. (This was 48K on my 128K CoCo 3.) Column Location is a counter starting at 1, which increments on each keystroke to either 40 or 80 depending on your column width selection. U/L Case indicates either upper- or lowercase, and is toggled with SHIFT-0 just like in BASIC.

You will also find that the F2 key functions as a backspace delete key while in the Insert mode. Automatic key repeat is also invoked and repeats any key held down after about a one-second delay. You can exit the Insert mode at any time by pressing the BREAK/ESCAPE key.

The Print command invokes a format menu with impressive options that can be changed by the user.

Space simply does not permit me to explain each and every detail of *Elite*Word/80*; however, suffice it to say there is also a whole range of control keys available for text editing and file manipulation. These commands are used in conjunction with the CLEAR or CONTROL keys. CLEAR-E, for example, inserts an "Eject" control code in the text file that causes your printer to do a form feed to the top of the next page. You can also define headers and footers to be printed at the top and bottom of each page. And one I especially liked was the auto-centering command CLEAR-C. CLEAR-W toggles between 40- and 80-column text modes.

One other important point is that error codes and sounds are used throughout the program to tell you if you are doing something wrong. If you do encounter an error, you will be returned to the main command mode and will not lose your text.

In summary, I was impressed with the overall ease of this program's operation. The documentation is detailed and complete in every way. There are 38 pages of easy-to-read, understandable instructions provided, with examples. I believe that *Elite*Word/80* is destined to become a new standard in word processing for the Color Computer 3. If you have not yet purchased a word processor for your new computer, I urge you to consider this latest development from Elite Software. I think you will be glad you did.

(Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, $79.95 plus $3 S/H)

— Jerry Semones

River Crossing for the Armchair General

Tired of "shoot-'em-up" games? Are your joysticks smoldering from trying to shoot all those space nasties? Then it's time to sit back, give the old wrist a chance to relax and get those brain cells working with *River Crossing*.

In the past, armchair generals have simulated famous battles in history using the typical implements of the board game — counters, dice and a map of the battle. Such games often have a board the size of the average kitchen table and literally hundreds of counters which designate the various military/naval units in the battle. On top of this is the rule book, which not only gives the instructions for play but also the decision logic needed to determine who won when opposing units meet in battle. The rule book is usually 25 pages or more and takes considerable time to digest. When you are finally ready to play, you then have to find someone who has also gone through the same process. If you are successful at all this and manage to get a game going, Murphy's Law (if anything can go wrong, it will) surfaces about half-way through the game, e.g., the family cat jumps on the board and sends those hundreds of counters all over the place. At this point, enter Ark Royal with *River Crossing* and, of course, your friendly CoCo.

River Crossing is a tactical computer wargame that simulates "small-scale" battles. In other words, it does not attempt to simulate large-scale battles such as *DDay* or *Battle of the Bulge* (also products of Ark Royal). The game requires a 32K Color Computer and is written in BASIC with machine language subroutines. Essentially, the program does two things: It provides all of the implements needed to simulate the battle; and it provides the opponent, i.e., you don't have to find someone who has read the rules — CoCo knows them all.

River Crossing displays the battle map using semigraphics (text graphics) with letters representing your military units and various color blocks representing the river, roads, forest, etc. Now, before all you "must-have-Hi-Res" people get bent out of shape, I actually like this approach. I can sit back and enjoy the game without eyestrain.

Provided with *River Crossing* are 12 scenarios, so you really have 12 games in one. For each one of the 12 scenarios, you can choose one of five skill levels. Upon loading the game, which is available on tape or disk, you select the scenario, skill level and if you want to use the high-speed poke.

The objective is to eliminate the prescribed number of enemy units and secure a defined area of the map with a designated troop strength. In some of the scenarios, you must marshal your forces, cross the river and secure the designated area. In others, you already occupy the area and must defend against the enemy. The objective is accomplished by moving your forces and engaging in battle with the enemy using weapons available in that scenario.

River Crossing contains a number of features that attempt to make the Simulation as realistic as possible. For example, a unit cannot fire on an enemy unless it can see the enemy, i.e., the terrain does not block the "line of site;" air strikes cannot be called by a unit unless it has a radio; unit movement, which is based on an assigned movement factor, i.e. the maximum number of squares which a unit may move in its turn, is a function of the terrain — roads are full movement whereas the forest reduces a unit's movement and river crossing takes essentially one square per turn. Other factors such as the late arrival of additional troops and the surprise enemy attacks from behind the trees leave the impression of a realistic battle.

During the review of *River Crossing*, my son Chris and I played approximately 25 separate games and found no bugs in the game. Once you get the hang of it, the game is very interesting and challenging. Unfortunately, like so many software packages, the documentation is not particularly good. While all of the information needed to play the game is there, it is not clearly organized and presented in a fashion that the newcomer can pick up easily. If you have played war game Simulations, you will have little problem learning *River Crossing*; if you haven't, it will take some time and study, but I can assure you that it is worth it.

Ark Royal specializes in wargaming and has put a lot of effort in this area as one can easily see from their bimonthly newsletter, *The Keyboard General*, available for a nominal yearly subscription.

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238; 904-786-8603, $23)

— Donald Dollberg

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Software Review

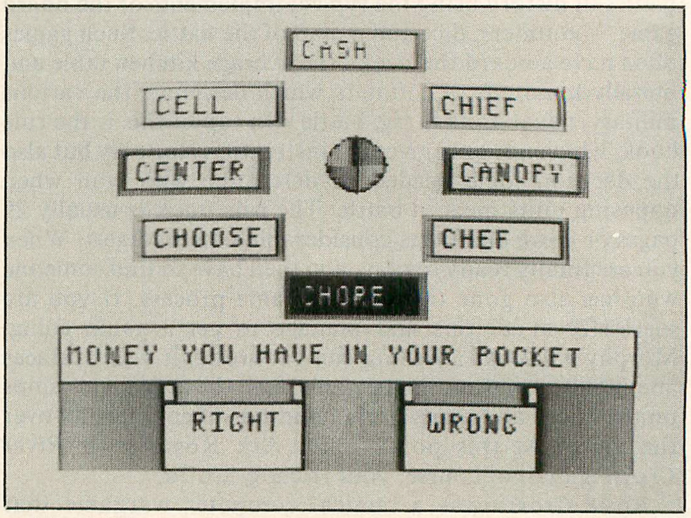
Build a Better Vocabulary With *The Word Factory's Word Meaning*

The Word Factory's Word Meaning consists of three educational programs, Game, List Maker and Printer. The programs are designed to build a child's vocabulary by fitting the right word to a sentence. The program also allows a parent to input new words and sentences, and a teacher to prepare written tests.

The program is written for a CoCo with 64K, and requires a disk drive and a printer if tests are desired. I ran the program on my CoCo 3, with RS-DOS and disk drive, and an Epson MX-80 printer. Everything worked well, but I had to experiment to find the right baud rate for my printer.

The manual recommends a backup disk and asks that the copyright be protected. Upon running the program, you are treated to a high resolution graphics title page followed by a menu allowing selection of any of the three programs. The first program, Game, tests a child's vocabulary. It presents a phrase or sentence and eight blocks containing single words. The program rotates from word to word until the player selects the word most pertinent to the phrase and presses the space bar. There are two boxes shown for "right" and "wrong" where scores are kept. At the outset of the program, the player selects the game list to be played from a menu shown. If a list has been created in the List Maker program, it appears here. The player then selects the number of questions to be presented (from 10 to 50) and the speed of play (four speeds).

The game allows rotation through the array of words three times before declaring the player wrong. Players get a second chance to answer wrong words at the end of the specified number of questions. Scoring is based upon the speed selected (the faster the speed the higher the score), the quickness of the answer (higher score bonus for answer on first rotation) and, of course, correctness of answer. Scores may be saved to disk providing they are higher than those already stored. The highest possible score is obtained by using the maximum number of questions at the highest rate of speed.



List Maker provides the means for creating original sets of words and phrases. The program uses a code name supplied by the user to identify and store lists created. This is a particularly useful part of the program package because it provides the capability to create an endless series of lists that can be tailored to a child's particular vocabulary needs. The lists can be stored on the program disk or on a separate disk, allowing greater storage capacity. A menu option allows previously created lists to be added to, providing you stay within the 143 maximum word limit. An option is also provided to correct existing lists.

The third program, Printer, produces test sheets for classroom use. The tests are of the multiple-choice type with four choices. The program also produces an answer sheet for each test generated. Three menu choices are available for test preparation. The first selects a list at random, the second uses a list of the user's choice. The third option allows the user to select words as the program scans lists.

A bonus program called Dir is included in the package. This program loads into the unused 8K of memory located above Disk BASIC RAM. Dir allows viewing of all the files on a disk at one time.

The Word Factory's Word Meaning comes with a concise, clear manual and is user-friendly. This is a good educational package to aid in the development of a child's vocabulary and is a fun game to play. I think it is a good value for the price, particularly with the offer of 20 free disks with each program sold.

(SECA, P.O. Box 3134, Gulfport, MS 39505; 601-832-8236, $24.98)

— Mel Siegel

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What Else, But a RAM Disk — The SC68008 *RAMdisk*

When I first heard that Cir-Pak had designed a 68008 coprocessor card that would work with the CoCo, I dreamed of the unlimited possibilities that were now within reach. Quite honestly, though, using this powerful device as a RAM disk was not one of them. While at first skeptical, I soon became an ardent fan of Cir-Pak Limited's SC68008 OS9-*RAMdisk*.

It should be made clear that this software package does require Cir-Pak's SC68008 coprocessor card and the OS-9 operating system; without both you cannot utilize this package.

Since the SC68008 allows for 256K of memory, Cir-Pak wrote an OS-9 device descriptor and a device driver that allows this memory to be used as a RAM disk. For those not familiar with the concept, a RAM disk is a block of memory that appears to the operating system as another disk drive. The big advantage to this, in addition to adding another disk drive to your system, is that RAM disks typically run 10 to 50 times faster than a normal disk drive. This *RAMdisk* is given the name /rd and can be used anywhere that /d0 and /d1 are normally used. Cir-Pak also provides a batch file that transfers all of the OS-9 system commands to the *RAMdisk* so that the access and loading of these commands is much faster. Believe me, once you are used to the speed of a RAM disk, floppies become painful.

What does give the SC68008 *RAMdisk* an edge over all of the other OS-9 RAM disks is that most of the code associated with making this *RAMdisk* work resides on the coprocessor card, not within the CoCo's precious memory space (as all other RAM disks do). In the OS-9 environment, quite often the name of the game is to save as much memory as possible. The less that is tied up with hardware drivers and system overhead, the better. Of course, the cost is that you must own an SC68008 card.

The documentation for this product consisted of two pages, but none was really needed. There is just enough documentation to install the software perfectly every time.

If you already own, or are planning to purchase an SC68008 coprocessor card to use with the OS-9 operating system, don't even hesitate — buy the SC68008 *RAMdisk*. You will not be disappointed.

(Cir-Pak, Ltd., P.O. Box 410, Varennes, Quebec, Canada J0L 2P0; Distributed in U.S. by Orbit Electronics, P.O. Box 613, Derby Line, VT 05830; 819-876-2926, *RAMdisk*, $59; SC68008 Board with 256K DRAM, $339 U.S.)

— J. Kleinwaechter

See You at RAINBOWfest — Chicago April 10-12

The RAINBOW

THE COLOR COMPUTER MONTHLY MAGAZINE

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Teacher Pak Plus Lightens the Classroom Load

Teacher Pak Plus consists of a set of four 16K programs that have been revised and improved. They are specifically intended for teachers as an aid to grading and managing classes. An additional program, *CoCo Testem II*, is sold separately to prepare tests.

These days with the variety of hardware types and mods available, it is important to define the hardware required for a program. These programs are written for the CoCo, cassette or disk drive, 16K of RAM capacity, and a Radio Shack printer. I used my new CoCo 3, RS-DOS with disk drive and my Epson MX-80 printer, with complete success. The instructions provide some simple changes that can be made for non-Radio Shack printers for underlining.

The first program, Dister2, performs statistical analyses of a series of numbers. It provides averages, sample and population standard deviations, and variances. Though intended for class grades, it can be used for any series of numbers. This program produces both printed and onscreen presentations, and data can be saved on tape or disk. It would be a valuable tool for a teacher to establish test scoring distributions and averages, and to provide direction in scoring by the curve.

Grader2 is designed to calculate end-of-term or mid-term grades for individual students. This program also provides printouts and onscreen presentations, with input titles including class description and student names. Data can be saved to tape or disk.

The third program, Alpher2, alphabetizes input class names. Output can be saved to tape and disk, and may be used with Grader2 and Seater2.

The last program, Seater2, utilizes input names to prepare classroom seating charts. Remember how Professor Kingsfield used a class chart to call on his law students in *Paper Chase*? This program not only prepares the chart, but allows the teacher to move students on the chart as the occasion arises.

The extra program, not included in the *Teacher Pak Plus* package, is *CoCo Testem II*. This program helps the teacher in preparing tests. It will take multiple choice, completion, short answer, true/false or matching questions. Again, data may be saved on tape or disk and revised or reused.

Though the instructions provided are on two pages and are therefore brief, the programs are user-friendly and do not require a great deal of familiarization. The menus are self-explanatory and allow review and modification of data, as well as subsequent addition or deletion of information. I did not run into any glitches in operating these programs, which is somewhat unusual in unfamiliar program operation.

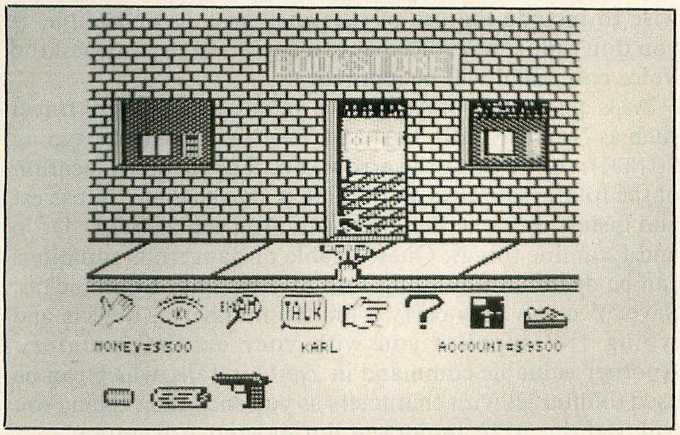
Teacher Pak Plus and *CoCo Testem II* should be valuable aids to a teacher with a CoCo. The ability to score individual tests and track grading through a semester, as well as to prepare tests, will make any teacher's life easier.

(Tothian Software Inc., Box 663, Rimersburg, PA 16248; *Teacher Pak Plus*, $47.95; *CoCo Testem II*, $19.95)

— Mel Siegel

Interbank Incident: A Rendezvous With Adventure

Who but a secret agent gets a private jet and a large expense account, while getting more than a fair share of excitement? You can become an agent for The Agency in the *Interbank Incident* from Tandy, and set out to recover a code book that controls a top secret satellite capable of destroying a city. Your search for this elusive book takes you around the world. From a small bookstore in Seattle to the Louvre in Paris to a huge casino in Rio de Janeiro, clues are scattered in every corner of the world.

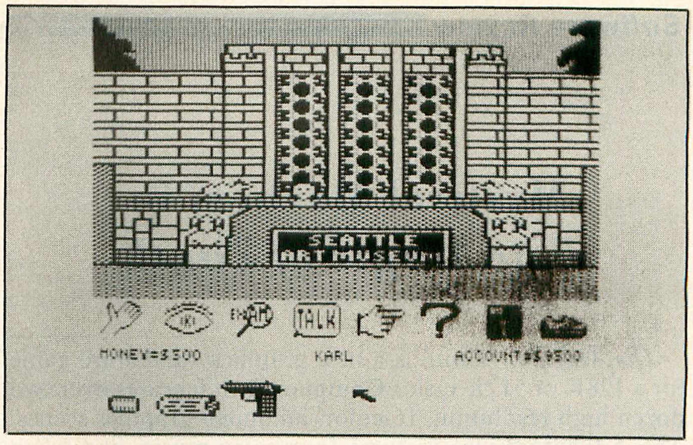


There are three things that make this Adventure especially interesting. The first, and most important, is that instead of typing in your commands, you can use a joystick or a mouse to select from a panel of eight icons to carry out your task. For example, instead of typing `EXAMINE THE PAINTING`, all you have to do is point to the icon of the eye or the magnifying glass and then to the painting. By combining the various icons, you can do just about everything you've ever wanted to do in an Adventure game (except swear at it, of course). For those of us who have never been very good typists, this feature is a boon.

Another thing that makes this game great is the highly developed graphics. The details are very good, and it doesn't add objects that it does not recognize. The many screens of detailed graphics keep you interested, even though you have to wait for them, but I'll explain that later.

The final thing that makes this game fun is that every time you play it, it is different. The first thing you do in each Adventure is choose which secret agent you want to play. Each of the eight agents has strong and weak points. From an ex-marine to a Nobel Prize winner, there is an agent made for you. All the agents get different responses from the people they meet and each handles situations differently. Also, the clues are scrambled and no object is in the same place twice.

Unfortunately, this program is not quite problem-free. There are a couple of flaws that keep this Adventure from being the best it could be. Tandy seems to have forgotten the ones who made the CoCo successful originally. They make the owners of CoCo 1s type in a special program to boot it up. Although it is nice that they set it up so that it boots with CoCo 2's `DOS` command, it really bothers me that Tandy seems to think now that old CoCos are not important. Also, this game is really slow. On many commands, especially movement, you have to wait while the program accesses the disk to find out the results. It becomes even worse when you select the wrong thing and have to wait such a long time to correct yourself. But as I said above, the great graphics do help pass the time because they are so interesting.



I would heartily recommend this game to everyone but the most impatient CoCo users. In my opinion, the benefits of this spectacular game outweigh the few disadvantages.

(Infocom, Inc., 125 Cambridge Park Drive, Cambridge, MA 02140; 617-492-6000, $29.95. Available in Radio Shack stores nationwide.)

— Karl Lowenstein

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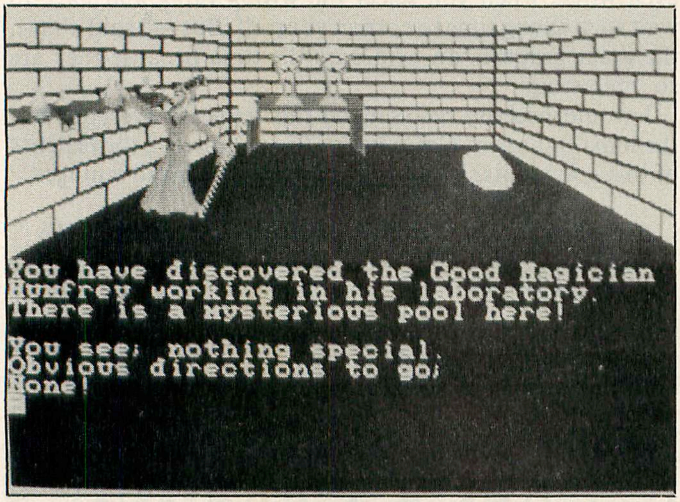
Mystical Mayhem in *The Magic of Zanth*

The Magic of Zanth is a new graphics Adventure game for a 128K or 512K Color Computer 3. It features over two dozen high resolution, 16-color, animated graphics scenes. The Adventure also features four-voice music, and when used with a Multi-Pak interface and a Tandy Sound/Speech Program Pak, even talks. This Adventure has it all!



```
You have discovered the Good Magician
Humfrey working in his laboratory.
There is a mysterious pool here!

You see; nothing special.
Obvious directions to go;
None!
```

The program is supplied on a copy-protected disk, but a generous replacement offer is available should you experience loading problems. Its best colors and resolution are obtained on an RGB monitor such as the Tandy CM-8. During the loading process, you may select a composite monitor. I tried an Amdek Color-1 Plus, but the colors and detail were not nearly as good as on the CM-8. You should also plan on having a blank RS-DOS formatted disk handy to be used as a "game save" disk. Believe me, you will want to use the Save option frequently!

This Adventure centers around the land of Zanth where magic abounds. It takes a very active imagination and a lot of patience to solve this Adventure. You will come face to face with dragons, griffins, centaurs and demons. Your mission is to discover the source of all magic in Zanth. You must enlist the aid of the good magician, Humfrey, to assist you in your Adventure and this in itself is quite a task.

The use of the voice pack, while novel and cute, is by no means a necessary addition. In fact, you can toggle the speech on and off with the command Voice at any prompt. After listening to the slow, monotone computer voice for 5 or 6 moves I had heard enough and turned it off. I could read the text a lot faster and be ready for the next move before the darned thing quit talking! This is not to condemn the use of the voice pack, however. On the contrary, I'm sure it will benefit younger children by helping them read the text. I believe the program's author, Scott Cabit, was wise to include the use of the voice pack as an option. If you don't plug in a voice pack, it can't talk anyway and the Voice command will be ignored.

As is customary in Adventure games, directions of travel such as North, South, East and West are invoked by typing `GO NORTH` or by using the arrow keys. The clustered location of the four arrow keys on the CoCo 3 make them the easiest and fastest way to enter directions. You can also Get, Drop and Examine things. Questionable or dangerous situations can be dealt with by using Info or Help and, by all means, Save. You can only carry a limited number of objects and typing `INV` supplies you with your current inventory. Another valuable command in *Zanth* is Talk, which can be used to interact with characters as you encounter them. You will find this to be important during your Adventure.

I found *The Magic of Zanth* to be a real challenge. I enjoy graphics Adventures and have solved many, but as of this writing, this one eludes me . . . though I'm getting close. This is a fine program, with excellent loading and operating instructions and it is nicely packaged. It does a nice job of capitalizing on the new features of the Color Computer 3, and I recommend it for challenging enjoyment.

(Computerware, 4403 Manchester Ave., Suite 102-Box 668, Encinitas, CA 92024; 619-436-3512, $34.95 plus $2 S/H)

— David Gerald

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Kamelion — The Interface Operating systems of a Different Color

Whenever new hardware is brought onto the market, there is often a substantial wait until the proper accompanying software is developed. More often than not there are tools designed to help make this delay as short as possible. Cir-Pak's SC68008 coprocessor card is that hardware and *Kamelion* by D.J. Leffler is that tool. *Kamelion* is self-titled as an Interface Operating System (IOS). It was designed to provide future software developers with a psuedo-operating system for the SC68008. If you do not own an SC68008, this software is of no value to you. This IOS is an extension to the Monitor provided by Cir-Pak. All features available to Monitor are directly accessible by *Kamelion*.

Kamelion provides four basic types of commands: Disk Basic, Monitor, 68008 Direct and Complex routines. Monitor commands are just duplicates of those commands already provided by Cir-Pak's Monitor, as stated earlier. Disk BASIC commands are a few of the commands provided by RS-DOS or JDOS. Among those available are `DIR`, `DRIVE`, `EXEC`, `FREE`, `KILL`, `LOADM`, `RENAME`, `SAVEM`, `UNLOAD` and `CLS` for both RS-DOS and JDOS users and `RATE` for JDOS users only. While both the Monitor and Disk BASIC commands are handy, they are simply extensions to previously available software. All of the unique software lies in the 68008 Direct and Complex routines.

There are five 68008 Direct commands: Load, Save, Go, Do and Bas. Load and Save are equivalent to the RS-DOS compliments in that they load and save data from memory to disk or vice-versa. They differ in that they work with the 68008's memory area rather than the CoCo's. The Go command is equivalent to RS-DOS's `EXEC`. It allows for the execution of 68008 user mode programs. Do performs the same function except that it executes 68008 system mode programs, and Bas allows the user to return to the CoCo's warm start state (BASIC).

There are two Complex commands: Configure and Lbug. Configure is used as a multiple-program loader. Its function is to load the files listed in the file `CONFIGUR.BAS` into the 68008's memory. `CONFIGUR.BAS` is a simple ASCII file that has a 68008 filename on each line. I am not sure of the great advantage of this command or why it is considered "complex." It is left for the user to discover its value. Lbug, on the other hand, is a useful little program that can be used to debug 6809 programs. It is an interrupt-driven debugger. Its function is similar to Monitor's except that it works with 6809 code only and has a few sparse commands. These commands include the ability to breakpoint, alter the CoCo's memory, single step and dump 10 bytes of memory. Each command is executed by a single keystroke.

In addition to the BASIC commands provided by *Kamelion*, some BASIC interface service routines are provided that the user can call from any of his programs. These are an assortment of various routines that allow for the fetching of user input and the moving of data from memory to disk and to the screen in various combinations. *Kamelion* performs exactly what it claims to do. However, as is the case with all software, there is much more to consider in a proper evaluation, namely the human interface. I feel very stongly that the designer must have forgotten about the person sitting in front of the keyboard. This can first be evidenced by the fact that *Kamelion* requires the CoCo to be in 64K "all-RAM" mode — the designer assumes the user has such a program at his disposal, rather than providing one. His choice of how the screen is displayed is also lacking. He chooses to display data in both normal text and inverse video, which can sometimes be effective, but not in the manner he chose. It makes the screen very difficult to read, at best. Also annoying is the fact that Lbug does not remember where it was last working, except in the single step command. For instance, if you want to change several contiguous memory locations, you must enter a new command and address for each byte. This alone is unacceptable.

Also lacking in performance was the *Kamelion* owner's manual. There isn't a subject in the manual that shouldn't have been elaborated upon more than it is. A whole section is dedicated to what is termed "Vocabulary." This section is meant for those who also own a companion program called *LFAST*. This is fine, except that the exact same section is repeated in the *LFAST* manual. Not only is it unneccessary, it is very confusing. The order in which topics are handled makes very little sense. One-half of the manual is an appendix. This would be OK, but why are the Lbug directions in the appendix, when "Vocabulary" is not? The sense of organization conveys little to the user. I know that organization can be a very personal thing, so I decided to ask several other, knowledgable CoCo users to read through the manual. Not suprisingly, I received the same criticisms.

In viewing the package as a whole, I find *Kamelion* has some very good possiblities. I think, however, that it needs some major revisions. Since there is no other package to compete with it, these criticisms may be unimportant to those who need what this package has to offer.

(D.J. Leffler, 955 Trinidad Road, Cocoa Beach, FL 32931; 305-783-2713, $78.50.)

— J. Kleinwaechter

Two-Liner Contest Winner . . .

Just run *Writer* and then type away. Your messages will be sent to your printer.

The listing:

```
10 CLS3:PRINT@32,"MAGIC PRINTER
WRITER>";:PRINT@128,"";:A$=INKEY
$:IF A$="" THEN 10 ELSE IF A$=CH
R$(13) THEN PRINT#-2," "
20 PRINT #-2,A$;:GOTO 10
```

Jonathan Bentley
Alta Loma, CA

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

Control Disk Pile-Up With *Keeping Track*

Presently, many, if not most, Color Computer users own disk drives for their CoCos. As these people use their disk drives, a strange phenomenon occurs; the diskettes pile-up. We get so many disks involved to perform relatively few tasks that we become confused about what is where and how to get to it. *Keeping Track* from Duck Productions was designed to help us in our time of need.

Keeping Track is actually a compilation of several useful routines and utilities for disk drive owners. The first program on the disk is named D. This BASIC utility, when run, presents a directory of the disk in the drive on the screen. Information regarding disk name, number and backup notation is also presented on this screen.

This information is created using a different utility so it won't necessarily appear the first time you run D. From the "screen directory," you can use the arrow keys to point to a given file and press ENTER to run the file. This can be quite handy, as D only occupies one granule of disk space and can be copied to every disk in your library.

The other program on the disk, the *Keeping Track* program itself, is a menu for several smaller utilities. These include Dos Boot Creator, Alpha Directory, Disk File Address, Disk Comparison, Directory Print, Directory Saver, True Drive Test and Parameter Reset.

Dos Boot Creator writes the D binary file and installs it on any formatted disk. It embeds your disk number and name, which you enter, into the binary code of the D program. While running Dos Boot Creator, you are also given the opportunity to begin creating an identical set of backups of the disks in your library.

Alpha Directory is a utility designed to alphabetically sort the directory of any disk you select. As a bonus, it sorts the disk as usual, but if it finds the D program, it will automatically place it at the beginning of the directory. This makes it easier when you want to run the D program.

Disk File Address will print the start, ending and execute addresses of any machine language file on the disk, as well as the length of the file. You have the option of printing this information to the screen or a printer. You may also have the program print this information for every ML file on the disk or just specific files. This particular utility, while very useful, appeared to be quite slow in operation.

Disk Comparison is designed to keep your backup disks current. It compares one disk to another, say, a backup to a working copy, and reports all programs that do not have duplicates on the other disk. You then have the option of copying the unduplicated files in bulk or singly by entering the filenames. The copying procedure uses "verify on" which, while more time-consuming, ensures accurate copies of the files in question.

Directory Print, a general-purpose directory printing utility, will send a copy of a disk's directory to your printer so you can have a hard copy. This program prints the disk directory in two columns on a standard page. My gripe with this utility is that it seems to bomb out. When selecting this option from the *Keeping Track* menu, the disk drive kicks on to load the routine and then the user gets a Syntax Error in Line 11.

The program is list-protected, so you cannot even find out for sure what is happening. It appears the program tries to perform a `PCLEAR0`. Simply entering `RUN` at this point will cause the program to continue normally, but this is a hassle. Personally, I prefer a simple `POKE111,254:DIR`. It may only print in one column, but it works every time.

The Directory Saver utility is rather useful. It allows the user to protect up to 56 files on a disk by saving directory information to a place higher up in the directory track. Note that this does not take up any of the normally available space on the disk. It is then a simple matter to replace a damaged directory if the occasion arises.

The True Drive Test routine gives the user the ability to see how fast his/her disk drive is operating. This can be quite an important diagnostic tool when you begin having trouble with I/O Errors. It can also be quite useful if you take pride in maintaining your disk drives, though most technical types would be using much more sophisticated programs to maintain their disk drives.

The last selection on the *Keeping Track* menu is Parameter Reset. This routine is designed for the user to enter specific information about his system, such as the number of disk drives and printer baud rate. This selection should be the first one the new user picks. I was somewhat dismayed that the printer baud selection did not allow baud rates above 2400 baud.

Overall, *Keeping Track* is not a bad system. It combines several of the most desired utilities into one package. However, I don't think it is up to par with some of Duck Productions other offerings. I have seen what I consider to be far more useful disk utility programs at lower prices. I give *Keeping Track* a two-star rating on my four-star scale.

(Duck Productions, 18 Rowe Court, Brampton, Ontario, Canada L6X 252; 416-456-0032, $29.95)

— Cray Augsburg

Hint . . .

Banishing Burn-In

There are many times when I want to leave my computer system on while I am doing something else. The problem with this is that there is a chance the image coming from the computer will "burn in" on my display. To avoid this problem, I issue the following line:

```
0 CLS0:GOTO0
```

Now, when I am away, the screen will be black and no image can get burned in on my monitor. This line also works well from within a BASIC program, especially if used with some form of time delay.

Thomas J. Strike, Jr.
Saugas, CA

A Synopsis of the Books of the Holy Bible

Eddie Davis has used the power of BASIC to write a very simple program that provides the user with a short synopsis of the 66 books of the Bible.

Each synopsis contains the name of the book, the number of verses, the number of words and a brief outline of the material covered in the chapter.

The program would be an excellent addition to the collection of a beginning Bible student, a Sunday School teacher or a pastor. The material is quite simple, so it would also be useful for children, almost from the age of literacy.

The program loads by typing `BIBLEBKS`. You get a welcoming billboard, a few beeps and a message to press any key. You are then asked to select the book you want to see. You press any key and then type in the name of the book of the Bible. The synopsis appears on the screen and you are asked if you want a printout. If you say yes, the printer comes to life and zips out a neat little synopsis. I always print at 9600 baud, but my `POKE 150, 1` had little effect on the speed of the program, which is quite slow. There is not too much to print in the first place, so I suppose speed is not that important.

The manner in which the synopsis printing is accomplished caused my DMP-200 to deliver a couple of lines of symbols, which meant it did not understand a `CHR$` string being sent to it. It did not interfere with the working of the program, but it got my attention.

All in all, this is a very interesting program about a very interesting subject. It is on a beginner's level, so far as the study of the scriptures, and could be a very good teaching tool.

(Country Software, Route 1, Box 590, Taylorsville, MS 39168; 601-782-4633, $5 plus $1 S/H)

— Howard Lee Ball

One-Liner Contest Winner . . .

Here is a program that converts U.S. dollars to Canadian dollars or Mexican pesos, or vice versa. You will need to find the present exchange rate and edit it into the listing where you see the question marks.

The listing:

```
1 PRINT"$1CAN.=$???U.S.:":INPUTC
:PRINT"1 PESO=$???U.S.:":INPUTP:
PRINT"HOW MANY?":INPUTX:PRINT"$"
X"U.S=$"X/C"CAN","$"X"U.S=="X/P"
MEXICAN PESOS":PRINT"$"X"CAN=$"X
*C"U.S"," "X"MEXICAN PESOS=$"X*P
"U.S."
```

Gerald Carroll
Kirkland, Quebec

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

That Old Time Religion With *CoCo Hymnal*

Have your parents ever wondered just what it is you spend so much time doing on the old CoCo? Why not give them a treat by playing a few hymns, in four voices, upon your CoCo organ! *CoCo Hymnal* is a collection of 40 hymns on disk. It is full of many of your (and your parents') favorite gospel hymns, and is quite well done.

The arranger of these tunes, Mark Camp, states in the concise documentation that "they are by no means fancy arrangements, but should be considered in light of their meaning," but I disagree. In light of their meaning there really is no need to get too fancy, yet he has used a variety of voice tones and tempos so they don't all come out sounding the same. The words to many of the verses are included so you can sing along, or at least "make a joyful noise," and the option of playing each song separately or in groups is included. You are limited to choosing from eight at a time, but this is little inconvenience.

I must admit that although I am an ordained pastor, I only recognized about half of the hymns. However, my wife, who plays the organ, picked out almost every one. So, when you get tired of programming and need a little inspiration, *CoCo Hymnal* should be just the ticket.

(Sovereign Grace Software, 221 Highview Drive, Ballwin, MO 63011; 314-227-3238, $9.95 plus $2 S/H)

— Rev. Jefferson L. Hatch

Two-Liner Contest Winner . . .

This program will print out a bill of sale to your printer. Just run it and let it work.

The listing:

```
10 CLS:PRINT#-2,TAB(34);"BILL OF
 SALE":PRINT#-2:PRINT#-2:PRINT#-
2:PRINT#-2,"I-------------------
-do hereby sell and convey owner
ship of--------------------":PRI
NT#-2:PRINT#-2:PRINT#-2,"to-----
---------------on this date-----
---for the sum of $-----.
20 PRINT#-2:PRINT#-2,"SERIAL NO.
:--------------":PRINT#-2:PRINT#-
2:PRINT#-2:PRINT#-2,"SELLER:----
-------------                WITNE
SS:--------------------":PRINT#-
2:PRINT#-2:PRINT#-2,"BUYER:-----
-------------                WITNE
SS:--------------------"
```

Eddie David
Taylorsville, MS

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

In Touch With the World: *Softreader*

If you are one of the many CoCo users who also own a short-wave receiver and would like to get added utility from your computer, *Softreader* from CoCo Enterprises will be of interest to you. If you are not into short-wave, you may want to be after you hear what this program can do.

Softreader is an RTTY (Radio Teletype) program designed to work with all versions of the Color Computer, including the new CoCo 3. It requires at least 16K and can be ordered for either tape or disk systems. The software is not copy-protected, so backup copies can be made for your own use and protection. The copy supplied for review was on disk so keep that in mind as you read this.

No interfacing is required. All you have to do is connect the black cassette plug that normally plugs into the cassette earphone jack to the loudspeaker or phone jack of your short-wave receiver. A simple audio filter that runs off two 9-volt transistor radio batteries is available at extra cost and improves RTTY reception quality. This filter simply connects between the loudspeaker or jack and the black cassette plug.

Documentation is detailed and complete. Nine pages are contained in a plastic report cover and provide all of the information needed to get the program up and running in a very short period of time. A 20-minute demo cassette is provided that contains typical RTTY signals and can be used immediately to see the program actually work.

Upon running the program a main menu is presented with the following options: Manual, Automatic, Options, Print Buffer, Save Buffer and Quit.

In the Manual mode, you must select the received signal's baud rate, shift, and either normal or reverse. In the Automatic mode all this is done for you except for normal/reverse which you must select. If Options is selected, you will be sent to another menu where you can set such things as your printer's baud rate and automatic buffer dump to disk. You can turn on the auto buffer in the Options menu and send everything in the buffer to disk. An empty disk holds about 16 full buffers of about 9.6K each, which means you can get about 150K of text on each disk. After you have listened to the demo tape, you will begin to recognize what RTTY signals sound like. Then you can tune your short-wave receiver to the many international frequencies that are used for RTTY transmissions. There is a handy list included in the documentation that shows what frequencies to listen to as well as the time of day and the baud rate and shift of the transmitting stations. All kinds of information is transmitted via RTTY, ranging from news and weather to military traffic and ham radio.

"Tuning in" RTTY signals can be tricky without some sort of tuning indicator, but the authors of this program have made it simple. A built-in tuning indicator appears on the screen when you go to either the Automatic or Manual mode. As you slowly tune your receiver through the signal, a cursor appears over the three available "shifts" that the program will copy. These shifts are 850Hz, 425Hz, and 170Hz, which represent the majority of RTTY transmissions. The program can copy baud rates ranging from 45 to 100. A handy "noise gauge," which ranges from poor to good, is also shown on the screen. If the signal you are trying to tune in registers in the poor range of the gauge, then chances are pretty slim that you will be able to get reliable copy.

This is where the optional audio filter comes in handy since it helps filter out unwanted noise from the signal you are trying to copy. During actual RTTY reception, the top line of your screen displays the status of the various program parameters. All of the parameters can be changed instantly with a single keystroke. This makes it easy to change the baud rate, shift, and normal/reverse while listening to the signal and trying to tune it in. With the Automatic mode, a lot of the guesswork is taken out of these parameter changes, but it can take a minute or two for the program to detect the baud rate and shift. By that time you can usually set the baud rate and shift manually with a minimum of trouble. Once you get the hang of it, it's pretty simple to use.

One last point about the short-wave receiver. You don't need the latest state-of-the-art digital $300 wonder, but you do need a receiver that is fairly stable and does not drift excessively. It should also have a BFO (Beat Frequency Oscillator) like that used to copy CW or Morse Code transmissions. If the receiver can copy CW or Upper/Lower Side Band, it has a BFO. In order to copy international RTTY transmissions the receiver should tune frequencies from 2 to 27 MHz. You can find good used receivers at "Hamfests," flea markets and military surplus outlets.

I found *Softreader* to be an exciting entry into the Color Computer market. It's a lot of fun to use and provides a unique application for our favorite computer that could put you on the leading edge of world events.

(CoCo Enterprises, P.O. Box 5211, Laurel MD 20707; 301-498-1110, *Softreader*, $37.50; Audio Filter, $43.95; Both, $63.45)

— Jerry Semones

Two-Liner Contest Winner . . .

Just insert this subroutine in a program in which you want to copy the text screen to the printer. Then insert a `GOSUB 500` when the screen is ready.

The listing:

```
500 FORT=1024TO1535STEP32:FORX=0
TO31:A=PEEK(T+X):IF A<64 THEN A=
A+96 ELSE IF A>95 THEN A=A-64
501 PRINT#-2,CHR$(A);:NEXTX:PRIN
T#-2:NEXTT:RETURN
```

George Quellhorst
Painesville, OH

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

CoCo III 512K Upgrade: Money-Saving Modification

For those of you who are not afraid to tinker with the insides of your CoCo 3, here is a quick and simple 512K plug-in upgrade that you may want to consider.

The upgrade is made by PBJ Inc., and is a nicely designed and well-constructed plug-in circuit board. It consists of a double-sided glass-epoxy circuit board with 16 socketed 41256 120-ns DRAMS.

The overall size of the L-shaped board is 4½ by 2⅞ inches. Two rows of header pins extend from the bottom of the board and plug into matching sockets on the CoCo 3 board.

Installation is quick and simple. A four-page booklet is included that guides you through a step-by-step process. The instructions are well done and pictorial diagrams are used to help you find the various components that are affected during the installation. A 128K/512K RAM test is also included with the documentation.

After unplugging your CoCo 3 and removing six (the instructions say five) screws, the top of the computer is lifted off and set aside. At this point, you must make sure your body does not contain static electricity. You can touch a nearby cold water pipe or other grounded metal object to discharge yourself. The four 64K by 4 RAM chips (41464) that make up the present 128K RAM are removed and set aside. I recommend you place these chips in conductive foam and store them in a safe place so that you can go back to 128K RAM if the need ever arises.

Before you plug in the new 512K board, you must clip the leads on two small capacitors on the CoCo 3 board. They are identified as C65 and C66 in the diagram, and are easy to find and remove. The 512K board is then plugged into the two white sockets on the CoCo 3 board. I did have to slightly bend the long, narrow metal shield near the rear of the CoCo 3 board to allow the upgrade board to push down into the sockets. This shield is located just behind the joystick, cassette and serial sockets.

I noticed one other area of caution: While the instructions do not point this out, I strongly recommend that you place a small piece of thin cardboard over the upright, 10-mFd., 25-volt electrolytic capacitor desiginated as C82 on the CoCo 3 board. This capacitor is orange on my CoCo and sits just to the right of C66, which is one of the capacitors that must be removed prior to installing the 512K board.

The reason for this precaution is quite simple: The PBJ 512K board mounts all components on the top of the board, which is desirable from a heat dissipation standpoint. However, this then allows the cut ends of the various component connections to face down and possibly touch other components underneath. After examining this closely, the only vulnerable point was at C82. The vinyl covering on the capacitor does not completely cover the top and could be contacted by the cut ends of components protruding from the bottom of the 512K board. I should point out that in my case no contact was made, but if C82 were taller or soldered higher on the board, contact *could* be made. Just keep this in mind when you install this upgrade

It's interesting to note that Tandy gets around this problem not only by mounting the chips upside down, but also by using three nylon spacers that snap into the upgrade board and the CoCo 3 board, preventing the board from being pushed down too far in the sockets. The disadvantage to the Tandy approach, however, is poor air circulation.

Tandy also uses a ground plane or RF shield on the bottom of their board, which serves to cover the connection points. I was not able to determine if the ground plane made a difference, but I could not "hear" any RF interference on my short wave equipment nor could I "see" any additional interference while hooked up to a TV set.

Total installation time is about 20 minutes, not including the time it takes to type in the memory test program. It worked perfectly on power-up. I reassembled the case making sure I put the short screws in the keyboard end of the case. I was impressed with the quality of the PBJ upgrade. It also comes with a one-year warranty.

The best part is that you can upgrade it yourself and save money. So if you're ready to expand your CoCo 3's memory to its capacity, I recommend the PBJ 512K Upgrade. Now that we have the memory, all we need are some programs to use it all!

(Spectrum Projects, Inc., Box 264, Howard Beach, NY 11414; 718-835-1344, $139.95 with chips; $99.95 without chips, plus $3 S/H)

— Jerry Semones

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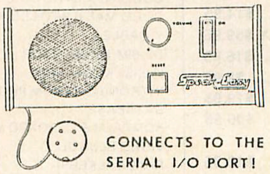
```
10 INPUT A$
20 PRINT #-2,A$
30 GOTO 10
```

and imagine how you could upgrade your games and applications with simple printer statements to use Speak-Easy. It can say anything including foreign words. *If you can spell it, Speak-Easy can say it.*



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Language Arts Software for Reading and Spelling Skills

For the past two months, I've been reviewing study courses comprising an educational series available from Compass Education. This month, I will review the Language Arts study course.

The Language Arts curriculum is divided into three subcategories. In Lesson Plan 1, volumes I and II both contain short stories that are used to help the student develop essential reading ability and comprehension. In Lesson Plan 2, the student is introduced to spelling. The student will learn about pluralizing words, adding suffixes, spelling by syllables, and how to distinguish between homonyms like "scent" and "cent."

In Lesson Plan 3, the student will be helped to develop comprehension in definitions, spelling and synonyms in everyday vocabulary.

As I have stated in previous articles, these lesson plans are very well thought out, organized and presented. I especially enjoy the fact that there is an audio portion. This helps by explaining each new word and giving examples of how that word is used.

My son Eddie (he is usually my "tester" for any software I receive) and I sat down to check out these study courses. First we went through the reading comprehension series. Each lesson plan is actually a story that was read to Eddie while he followed the printed words that were displayed on the screen. Every couple of paragraphs or so, Eddie would be asked a few questions about material that had been previously presented. I think this way of teaching really develops comprehension, as Eddie wasn't just reading the words, he was really understanding what he had read.

At the end of each lesson plan you are shown a scoreboard, which shows you the total number of questions asked, the number answered correctly on the first try and the number of wrong responses. The two other sections, The Magic of Spelling and Vocabulary Comprehension, were both as enjoyable and challenging as the Reading Comprehension lesson plan.

I would recommend these study courses for anyone who enjoys language arts, or anyone who would like to review the rules of spelling.

(York Software, 9525 Vassar Avenue, Chatsworth, CA 91311; 818-700-0330, $49.95 per two-volume set, plus $3 S/H)

— John H. Appel

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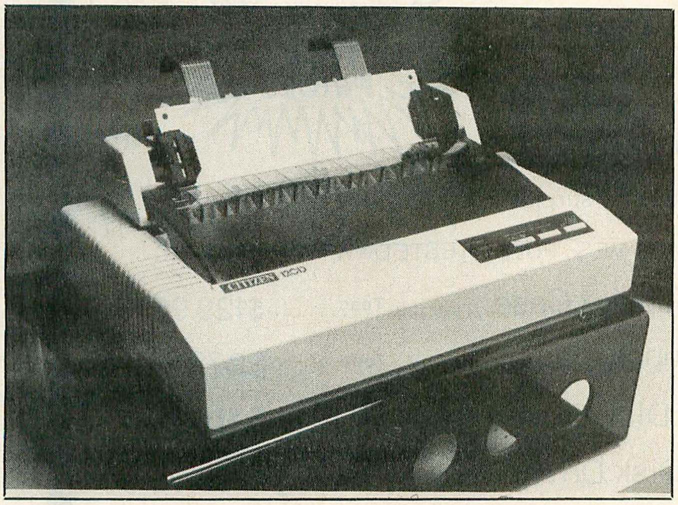

It offers a wide range of type styles including pica, elite, compressed, expanded, compressed expanded, italic, proportional, emphasized, double strike and correspondence quality. It also supports underlining, overscoring, reverse print, superscript, subscript and vertically enlarged print. Combining modes gives even greater flexibility — elite expanded emphasized italic, for example. For greater convenience, common combinations can be selected using the Master Print mode. Correspondence quality is available in all 14 character widths and heights, but not in reverse print. The control panel on the front allows the user to select various fonts.

The 120-D also has 11 international character sets, math and graphic symbols and even Greek letters available. The international characters (U.S., France, Germany, England, Denmark I, Sweden, Italy, Spain, Japan, Norway and Denmark II) can be used with any of the 120-D's other features including correspondence quality and italics.

Formatting your printout is easy. The 120-D has left and right justification, and auto-centering, along with tab printing, variable line spacing and variable line feeds.

Of course, it also does graphics. There are eight densities available: single-density, 60 dots per inch (dpi); double-density, 120 dpi; high-speed double-density, 120 dpi; quadruple-density, 240 dpi; CRT screen, 80 dpi; one-to-one, 72 dpi; Hi-Res CRT, 90 dpi; and two-to-one, 144 dpi.

For those who are just not satisified with the amazing array of characters and styles available, the 120-D allows the user to design his own characters. This feature is useful not only for adding a little flair to your printing, but also for special applications such as business, science or a foreign language not already included.

It is important to note that this package from Dayton Associates is a complete printer system. The printer includes a built-in serial interface with a cable to attach it to the CoCo. With this interface, the CoCo can send data to the printer at baud rates from 300 to 9600.

This system is not only ready to plug-and-go, it also includes a software package that contains a word processor to take advantage of the features of the printer; a program that allows you to set special features of the printer and test those functions; and `SUPERPRT` for producing screen dumps. The software is available on tape or disk, and normally sells for $19.95.

This printer is sleek, efficient and easy to use. At 9600 baud it prints fast enough to keep all but the most fanatical speed demons happy. The only drawback I could discover is the sound level. It tends to be a bit louder than other printers I have heard. But this is only a minor problem and detracts not at all from its fine performance.

The manual is very well-written and logically put together. The control codes are summarized in an appendix and there is a handy tear-out quick reference card.

With all its features, special characters and graphics, the Citizen 120-D System, including software and cable, is a good package at a good price.

(Dayton Associates, 7201 Claircrest Drive, Dayton, OH 45424; 513-236-1454, $229.95)

— Jo Anna Arnott

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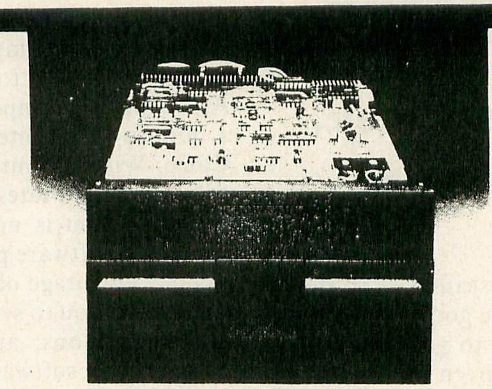

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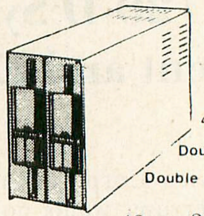

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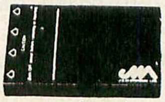

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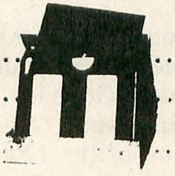

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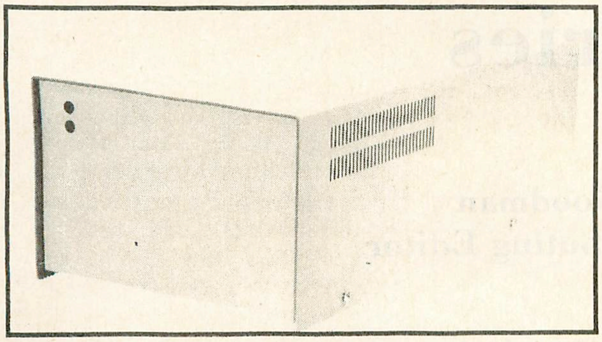

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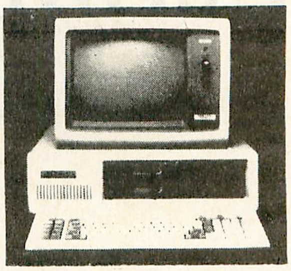

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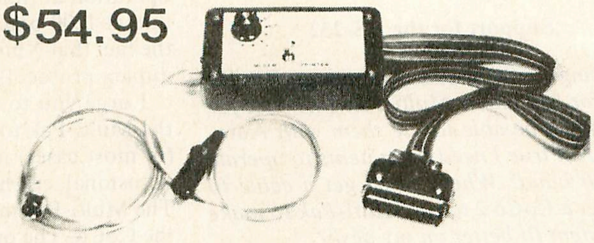

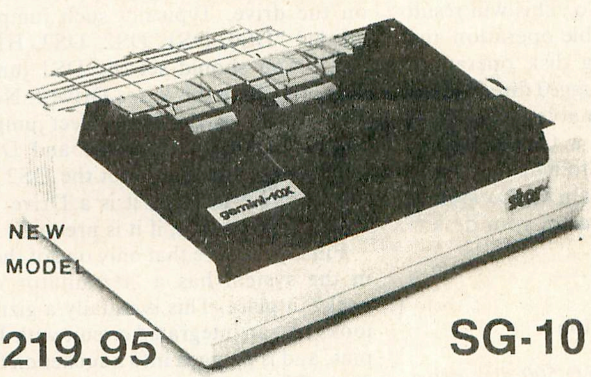

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Uncovering ROM RAM Mysteries

By Marty Goodman
Rainbow Contributing Editor

Why is it that when I run a ROMRAM program ("Downloads" August 1985) on my CoCo 3, I find that programs which would not previously run on my CoCo 3 now run correctly?

Bruce E. Ondersma
(BEO)
Grand Rapids, MI

When the CoCo 3 wakes up after power up or cold start, it has copied its ROMs into RAM, and then heavily patched them for the CoCo 3's extra BASIC commands. You are operating in "all-RAM" mode. But, although you are using a heavily patched and modified version of the ROMs, a pretty near exact image of the old CoCo 2 ROMs is lurking within. When you run the *ROMRAM* program, you are actually loading into RAM a nearly exact (and unpatched) image of the old CoCo 2 ROMs.

Support for the RS-232

During a recent sale I bought a RS-232 pack for $30 and a Multi-Pak Interface for $70. Will I be able to use them with Autoterm*? Is it true I need these items to operate at 1200 baud? Where can I get a cable to connect a CoCo 2 to the Multi-Pak to make my system fit better on my desk?*

David Johnson
(DAVIDJOHNSON)
Leicester, NC

RAINBOW's Jim Reed tells me that the new Disk Version 5 of *Autoterm* supports the RS-232 pack and Xmodem, too. He says an added advantage of the RS-232 pack is that you can toggle the printer while online. *MikeyTerm* and *Greg-E-Term* among "shareware" programs, *Color Connection IV* from Computerware and *Data Pak II+* from Cer-Comp also provide support for the RS-232 pack from Radio Shack. When using it with these programs, you do need the Multi-Pak if you are using a disk-based system.

The RS-232 pack is needed if you want completely smooth and professional operation at 1200 baud or higher. Although it is interesting to note that *Autoterm, Greg-E-Term* and *Colorcom/E* all allow some degree of operation at 1200 baud via the "bit banger" (built-in 4-pin DIN serial) port, such operation is flawed by sluggish screen response and failure of proper full duplex operation at times, though Xmodem works fine at 1200 baud in such programs (due to the fact that Xmodem is an intrinsically half duplex protocol).

I urge you to not use a cable to connect the Multi-Pak to the CoCo. This will result (in most cases) in unreliable operation and occasional crashes during disk operation. The Multi-Pak must be plugged directly into the CoCo. The only reasonable way to clear up the mess caused by a CoCo system sprawling on your desk is to make a remote keyboard, and put the main CoCo system below, above, or to one side of your desk.

Drive Addition

I have a Radio Shack FD 500 disk drive unit and want to add a second drive to it. Should I get a single- or a double-sided drive? What is involved in adding the drive?

John D. Oravecz
(JORAVECZ)
Warren, OH

The drive you have in the unit is a single-sided drive. Radio Shack's Disk Extended BASIC is geared to work only with single-sided drives. OS-9 supports double-sided drives, but if you have one single- and one double-sided drive you will not be able to conveniently make backups of material on the double-sided drive. I recommend that if you are using only Radio Shack's Disk Extended BASIC system you add only a single-sided drive. But, if you are going to use OS-9, you would do well to get a double-sided drive, realizing that soon you'll need to get rid of the existing single-sided drive in the FD-500 unit and replace it with a double-sided drive.

Adding a drive is not hard; the details vary considerably from brand to brand. You must hook up the drive to a source of power, and hook up the 34-pin edge card connector to the cable inside the cabinet. Sometimes you will have to redo the cable if the edge card connector of one brand of drive does not exactly line up with that of the existing drive.

You will have to "configure" the new drive to make it think it is a given drive number. This consists of setting a jumper or switch on the drive. Typically such jumpers are labeled "DS0, DS1, DS2, DS3, HM, HS, MX." You should set the DS1 jumper to make the drive think it is Drive 1. Note that on some drives, the drive select jumpers are numbered DS1, DS2, DS3 and DS4. On these drives you would set the DS2 jumper for the drive to think it is a Drive 1. Also set the HM jumper, if it is present.

Finally, be sure that only one of the drives in the system has a "terminator resistor pack" in place. This is usually a gizmo that looks like an integrated circuit with 14 or 16 pins, and is plugged into a socket on the disk drive. There must be only one of these to a system. If the drive you are adding has a terminator pack plugged in when you get it, remove that pack because the existing drive in the FD-500 already has such a terminator.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW's CoCo SIG on Delphi. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Ghosting Memory Addresses

I've heard that some programs will work on a 128K CoCo 3 but not on a 512K CoCo 3. Is this so? If so, why?

James McDaniel
(NEWKID)
Brooklyn, NY

The problem you refer to occurs only under Radio Shack's Disk Extended BASIC, and not under OS-9. The problem only affects a small number of software offerings that were written by programmers who did not understand the workings of the CoCo 3's memory management unit.

The MMU on the CoCo 3 causes memory addresses to ghost in 64K blocks on a 128K CoCo 3. That is, if you write to address $00000, what you put there will be readable at $60000 also. Thus, some programmers carelessly wrote data into memory at one address, then later looked for it at another address modulo 64K. Because the two different addresses were matched by ghosting on the 128K CoCo 3, the program worked. But, when a 512K CoCo was used, the program was in the position of storing data in one place and then later looking for it in another.

True Break on the RS-232

How do I program the RS-232 pack to send a "true break"? I've looked at the information that comes with it, and I am still confused.

Rick Adams
(RICKADAMS)
Rhonert Park, CA

I am not surprised you are confused by the information that accompanies the pack. Radio Shack included most of the technical information on the 6551 UART chip, but left out critical material on just what bit does what in some of the registers. The information you want is present on Page 15 of the RS-232 pack manual. The register you need to deal with is called the Command Register and is mapped to $FF6A on the Multi-Pak. Bits 3 and 2 concern themselves with sending a true break signal. Those bits affect the pack as follows:

Bit	Transmitter	*RTS	Transmitter
3 2	Interrupt	Level	status
0 0	disabled	high	off
0 1	enabled	low	on
1 0	disabled	low	on
1 1	disabled	low	transmit Break

Thus, to send a true break, you merely need to store a $0C (bits 2 and 3 set) into $FF6A. Remember to first store the original contents of $FF6A, pause for the break to be sent, then restore the original contents into $FF6A.

Note that Bit 4 of the Command Register sets echo mode, Bit 0 sets DTR and Receiver interrupts, and Bit 1 sets the *IRQ interrupt from Bit 3 of the Status Register. Also note that in the table on Page 14 of the RS-232 pack manual regarding the Status Register, Radio Shack forgot to print the bit numbers. The items in that table relate to bits 0 through 7, with Bit 0 being the top item (Parity Error Bit) and Bit 7 being the bottom item (IRQ status). On Page 16, the table of Control Register functions also lacks needed information on what bit does what. The baud rate is set by bits 3, 2, 1 and 0 (these are represented respectively left to right in the table at the bottom of Page 16). The Receiver Clock Source is set by Bit 4, and the number of stop bits is set by Bit 7 of the control register.

The RS-232 to Modem Connection

I'm trying to get my RS-232 pack to talk to my Radio Shack modem. I'm using a cable from Radio Shack that has a 4-pin DIN connector at one end and a DB25 connector at the other. The DB25 is plugged into the RS-232 pack and the DIN connector is plugged into the modem. Yet, I can't get the modem to work. Can you help me?

George McCashin
(GMCC)
Chattanooga, TN

Several others on Delphi have had this problem. You are using the wrong cable. Instead, try using a 25-wire DB 25 to DB 25 connector to hook your pack to your modem. Radio Shack sells such a cable (Catalog No. 26-1408) for about $17, or you can make one for about $6 in parts if you shop discount catalogs. Nearly all modems will work fine with the RS-232 pack with such a "straight-through, 25-wire cable", provided their switches are set correctly. Note that you were using the DIN to RS-232 cable backwards; that cable was intended to have the DIN connector plug go to the CoCo and the DB25 connector go to the modem. Your problem stemmed from not tying high the needed hand shake pins on the RS-232 pack. But the best thing to do is to use the 25-wire cable.

CoCo-ized Dragon

I want to add a disk drive to my Dragon 64 computer, and want to make it Color Computer compatible.

Raymond E. Heath
Renton, WA

It is possible to make a Dragon 64 nearly 98 percent CoCo compatible. What is involved is replacing one EPROM with a slightly modified version of the code that is in the CoCo ROMs, rewiring the keyboard just a little, and rewiring the 40-pin bus so that + and - 12 volts are in the correct places. For a while some companies (such as Super Choc in Canada) sold CoCo ROMs modified for the Dragon, and the Los Angeles Users Group had a number of members running Dragons with modified CoCo EPROMs in them. These modifications resulted in a Dragon that thought it was a CoCo, would print out through the parallel port, but could access the serial port via a `PRINT #-3`. Because the Dragon was now pretty nearly a CoCo from both hardware and software points of view, it could even work fine with a normal CoCo disk controller plugged in.

The problem would be finding someone with a copy of the code for the "CoCo-ized Dragon" ROMs, who also had an EPROM programmer and could burn a version into a 27128 EPROM. For most, I would not recommend using a Dragon because it is an unsupported machine in this country. Rather, get a CoCo, a Multi-Pak and, if you need it, you can buy cards from RAINBOW advertisers that add a parallel port to the Multi-Pak.

Null Modem Cable

How do I make a null modem cable to connect the "bit banger" (4-pin DIN serial) ports from my CoCo 2 to my CoCo 3?

Richard Trasborg
(TRAS)
Staten Island, NY

To make the null modem you ask about, get two 4-pin DIN connectors (Catalog No. 274-007 at Radio Shack) and a three (or more) wire cable. Connect the pins as follows:

Plug 1	Plug 2	Signal Connection
Pin 3	Pin 3	ground to ground
Pin 2	Pin 4	RS-232 out to RS-232 in
Pin 4	Pin 2	RS-232 in to RS-232 out

This should work. It is possible that some CoCo software might demand a carrier detect line to be pulled up. This would require suppling some voltage (9 volts from a transistor radio battery would work) to Pin 1 of the serial connector on one or both of the CoCos.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

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3,785,000	Ben Collins, Clemson, SC
1,987,000	Jon Sowle, Sanford, FL
1,546,000	Jason Maxwell, Manchester, TN
1,253,200	Thomas Mayor, Brooklyn, NY
271,350	Wade Glenn, Castle Rock, WA
162,740	Patrico Gonzalez, Buenos Aires, Argentina
100,050	Maurice MacGarvey, Dawson Creek, British Columbia

QUE BIT *(Mike Ro Products)*

77,800	★Jennifer Hotaling, Duanesburg, NY

QUIX *(Tom Mix)*

1,404,000	★Curtis Goodson, Sao Paulo, Brazil
1,003,104	Elisa Goodson, Sao Paulo, Brazil
205,335	John Hotaling, Duanesburg, NY
104,034	Christopher Conley, North Attleboro, MA

RACER (THE RAINBOW, 3/85)

14.4	★Fallon Yager, Bellevue, ID

RADIO BALL *(Radio Shack)*

6,330,350	★Myriam Ferland, Trois-Rivieres, Quebec
4,510,740	Les Dorn, Eau Claire, WI
1,945,110	Dominic Deguire, St. Basile, Quebec
1,388,330	Benoit Filion, Ste-Therese, Quebec
1,330,500	Sara Grace, Baltimore, MD

ROBOTTACK *(Intracolor)*

2,122,150	★Ghislain Chillis & Michel Lessard, Trois-Rivieres, Quebec
1,020,800	Ian MacLachlan, Bethany, Ontario
975,850	Erik Huffman, Rochester Hills, MI
931,250	Keith Smith, Bethany, Ontario
637,600	Chad McClellan, Rushville, IN
378,950	David Yerger, New Tripoli, PA

SAILOR MAN *(Tom Mix)*

997,300	★John Licata, Richton Park, IL
983,300	Gabriel Assel, Cameron, MO
910,200	Mike McGeoch, Havertown, PA
879,100	Alan Drazen, Longwood, FL
741,100	Bryan Jenner, Calgary, Alberta
471,700	Nicole Hubler, Swanwick, IL
140,900	Patrico Gonzalez, Buenos Aires, Argentina

SEA DRAGON *(Adventure International)*

76,110	★Jean-Francois Morin, Loretteville, Quebec

SEA SEARCH *(Mark Data)*

100	★David Flynn, Socorro, NM

SHOOTING GALLERY *(Radio Shack)*

44,090	★Carolyn Coleman, Meriden, CT

SIR EGGBERT JUMPER (THE RAINBOW, 8/85)

1,660	★John Austin, Clifton, TX
568	Odene Kirk, Elgin, OR

SPEED RACER *(MichTron)*

145,400	★Brian King, Orlando, FL
142,720	Erik Huffman, Rochester Hills, MI
142,310	Kevin Cornell, Greentown, IN
142,100	Chris Harrison, Brooks, KY
139,210	Alan Drazen, Longwood, FL
102,230	Eddie Lawrence, Pasadena, Newfoundland

SPIDERCIDE *(Radio Shack)*

3,820	★Eddie Lawrence, Pasadena, Newfoundland
2,550	Charles Marlow, Briarwood, NY
2,000	Mike Watson, Northville, NY
1,740	Joel DeYoung, Manson, Manitoba
1,730	Jason Munson, Tucson, AZ

STAR BLAZE *(Radio Shack)*

9,350	★Michael Shahan, Bloomington, IN
8,750	J. Yosefkrinsky, Jerusalem, Israel
8,750	Jon Larson, Seligman, AZ
8,750	Kent Pirkle, Cumming, GA
8,400	John Guptill, Columbia, MO
8,200	Chris Coleman, Meriden, CT
8,150	Brian Abeling, Monticello, IA

STARLORD (THE RAINBOW, 8/86)

2,747,355	★Frederick Lajoie, Middleton, Nova Scotia
1,234,125	John Herbert, New Baltimore, MI
452,880	Brad Bansner, Wyomissing, PA
406,875	Mark Glover, Derby, NY
213,180	David Bartmess, Fayetteville, PA

STELLAR LIFE-LINE *(Radio Shack)*

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299,030	William Novobilsky, Lanoka Harbor, NJ
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250,600	Thomas Audas II, Fremont, CA
230,460	Tom Dunne, Pittsfield, NH

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TREKBOER *(Mark Data)*

142	★Paul Maxwell, Vancouver, British Columbia

TUBE FRENZY *(Aardvark)*

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121,740	Chris Banas, North West Territories, Canada

VICIOUS VIC (THE RAINBOW, 7/86)

10,489	★Karl Gulliford, Summerville, SC
6,294	Pat O'Neill, Nepean, Ontario
2,626	Brad Bansner, Wyomissing, PA
2,512	Jeff Brudereck, Wyomissing, PA
1,201	Maurice MacGarvey, Dawson Creek, British Columbia

THE VORTEX FACTOR *(Mark Data)*

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100/483	Rick & Brenda Stump, Laureldale, PA
210	Paul Maxwell, Vancouver, British Columbia

WARP FACTOR X *(Prickly-Pear)*

2,725,500	★Donald Porter, Summerville, SC

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2,061,000	★Byron Alford, Raytown, MO
1,300,500	Dan Brown, Pittsford, NY
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256,400	Blake Cadmus, Reading, PA
253,400	Bob Dewitt, Blue Island, IL
111,400	Jeff Miller, Bronson, MI
72,800	Tom Maccarone, Swampscott, MA

— Jody Doyle

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

In response to Danny Perkin's and Andy Wolstromer's letter (December '86), about *Dungeons of Daggorath*, there are four key points to solving the game:

1) Save all equipment and drop in front of you.

2) When fighting the wizard's image, attack him with both fire and ice rings.

3) When the wizard's image dies you only have left what you are carrying, so put a ring and sword in your hands.

4) To kill the wizard you must use the energy ring and elvish sword, and keep moving.

Maurice MacGarvey
Dawson Creek, British Columbia

Scoreboard:

Here are some hints in response to letters from David Beyer and Michael Heitz in the December '86 issue of RAINBOW.

In *Hitchhiker's Guide to the Galaxy*, you must keep the robot so busy it will not have time to clean up the fish. Try putting the satchel in front of the panel and the mail from your house on top of it.

In *Trekboer*, if you look at the panel in the wrecked ship, you will see one way it can be opened. Go north of the wrecked ship and you will find the material you need. On a different planet, there is a cenotaph, and if you look at it, you should be able to figure out the coordinates you need. Also, be sure to climb the cenotaph to get something you will need later.

Can anyone tell me how to get to the cave in *El Diablero*? I have tried to dream to get there, but keep getting told that "His power is too strong," so any help would be appreciated.

Richard King
Plymouth, IN

Scoreboard:

To help Sam Waldrop get the red and green keys in *Bedlam*:

To get the red key you must use the window hook.

To get the green key, go to the room but don't go in, then type `GET GREEN KEY`.

Michael Leturgez
Bloomington, IN

Scoreboard:

In reference to Joel De Young's letter about *The CoCo Zone*, you do not need the flashlight to get out of the casket. Try `DIG SHOVEL` or `DIG WELL`. You will find the flashlight, which you will need later on, after you get out of the casket. Good luck.

R. Sinisi
Saranac Lake, NY

Scoreboard:

In response to Mark Bourdeaux's question in the December '86 issue of THE RAINBOW. For *Hall of the King*: to find the stick you must go to the pool; it's up to you to see how to fill it. You'll find the match in the library (somewhere) and light a fire before you light your stick. Last but not least, you have to be powerful to bend the bars. To do that you need a key piece!

Paul Maxwell
Vancouver, British Columbia

OFF THE WALL

Scoreboard:

I have a few tips on *Downland*. When you are on Level 5, you must get the key off the wall by having your head slightly lower than it and jumping off the rope.

To get off the wall, hold the joystick toward the wall and press your button. You will bounce off the wall and catch the rope.

After moving from Chamber 0 to 1, stay in Chamber 1 until the timer is under 2000. Then go back to Chamber 6. The timer will be back to 4000, so you are not pressed for time.

I have trouble with Level 8 because I can't get from the horizontal to the second vertical rope. If anyone can help, please write to the "Scoreboard."

Quinn Granfor
Bismark, ND

WISE MOVES

Scoreboard:

Here are some assorted tips.

For *Vortex Factor*: To get into Cairo Moon you need a candle; try this. Take the statue of the bird to London 1200, then find the string there (somewhere). Go back to the cylinder and before going in, type `MELT BIRD`, then simply `MAKE CANDLE`. It is a wise move to find everything in London before lighting the candle and moving on. Also, try pulling a torch or two!

For *Draconian*: Unless you are a crack shot, you must sacrifice a man on levels 5 on up. What may be helpful is to blast all the modules except for one on your first pass (i.e., sacrificial jet), then, on the second pass, pick up all of the men.

Paul Maxwell
Vancouver, British Columbia

VORTEX VERSE

Scoreboard:

I've finally solved the *Vortex Factor*! Here's a poem I wrote for those of you who are still counting the fish.

Turn a torch that opens a wall,
Go on in — there's no need to stall.
Pick the lock with the pin,
Get the treasure and come out again.
Melt the bird while you have the string,
Make the candle and get into the machine.
Press the button and get the ring,
As you prepare to see the king.
Give him the object and follow him,
(Better hurry, your candle's gettin' dim.)
Pull the lever that opens a hole,
Go on down — you don't need a pole.
Get the final treasure and win the game,
Write to THE RAINBOW and enjoy the fame!

Hopefully, it will help. The whole solution can be obtained by calling the 21st Century Connection BBS (304) 768-7191, going to the CoCo SIG, and pressing M for the Color Computer Magazine.

Tommy Crouser
Dunbar, WV

DON'T ROCK THE BOAT

Scoreboard:

I have some hints for *ZORK I*. Always bring the scepter in the boat with you.

Also, drop all sharp things before boarding the boat, then get them afterwards. How do you kill the thief? I've tried, but I'm always unsuccessful.

Ronnie Scott
Ridgefield, WA

FINDING THE KEY

Scoreboard:

I have a few tips for *Bedlam*. Examine every room to find the secret door. Have Napoleon open the secret door. Or, get the pill, put it into the meat, then feed it to the dogs. Or, lead Picasso to the room where you started, then open the painted door. To get the red key, go to the dispensary and `GET RED KEY WITH HOOK`. To get the green key, stand outside the electro' room and type `GET GREEN KEY WITH HOOK`.

In *Raaka-Tu*, the rug is just a decoy to distract the player. `EXAMINE` every wall to find the gem.

In *Madness & the Minotaur*, I have gotten the flute, parchment and rope, played the flute at the music at the maze, exposed the ledge, but where does it reveal? Giving the sapphire to the packrat does nothing. Would someone please answer these questions so I can get the other 20 points?

John Riddle
Linthicum, MD

FREEZE WARNING

Scoreboard:

Here are some hints for *Enchanter*:

The adventurer goes where gnome man has gone before.

For defeating lances, find an armored foe: by the sea, from the sea, with speed, we go.

A warning about *Raaka-tu* — typing in an unknown word or phrase while running on the CoCo 3 causes the program to freeze.

Charly Rushing
Santa Rosa, CA

ESSENTIAL AMULET

Scoreboard:

I have a few helpful hints for *Trekboer* and *Planetfall*. On *Trekboer* — yes, you do need the amulet. It's on top of the cenotaph on the frozen planet. If you get as far as the garden planet, and have tied the rope to the tree, you need to carry *only* the amulet, another beaker-full of acid (gotten from the desert planet) and the yellow capsule. Cross the bridge; don't press the button before you go into the room — you'll get zapped. Go in the room; get the plant, and you are on your own. One last hint: You need to have the plant in your possession when you teleport to Earth.

On *Planetfall* — don't mind the demerits, always go by the port. Once the explosions begin, go to the escape pod and always go in the safety netting.

I am having problems solving the *Vortex Factor* by Mark Data. I keep dying on Cairo. Is there a light? How do you get the Bable fish on the *Hitchhiker's Guide to the Galaxy*? Help!

Eric Jones
Gautier, MI

THE THINGS THAT GET AWAY

Scoreboard:

I have a tip for *Protectors*: If you put the opposite joystick just about in the center of the "lasers" it will go over to the other side of the screen as well as the right side. This will help destroy the things that get away.

Keith Walter
Belvidere, IL

MADNESS TIDBITS

Scoreboard:

Here are some tidbits for *Madness & the Minotaur* players:

Never carry more than three objects and two treasures; the floor can easily cave in, reducing your strength, and it puts you in a bad situation.

If you have the scroll in hand, type `OPEN SCROLL` to summon the troglodyte to you. But only after something has already attacked you will that work. A spell with an 'O' in it helps with "a pile of rocks." A spell with an 'M' in it, plus the rope helps with the thing that the oracle never mentions.

Can anyone tell me what "the score on the parchment" means? Please send aid to "Scoreboard."

Dale Lampe
Sacramento, CA

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

Two-Liner Contest Winner . . .

This program lets you quickly and easily find the average value of a group of numbers. Just follow the screen prompts.

The listing:

```
0 CLS:PRINTTAB(3);"AVERAGER BY M
ICHAEL CRESS":PRINTSTRING$(32,"-
");:INPUT"HOW MANY NUMBERS TO BE
 AVERAGED";Q
1 CLS:C=C+1:INPUT"NUMBER-";N:T=T
+N:IFC=Q THEN A=T/Q:PRINT"AVERAG
E OF NUMBERS =";A,"NUMBERS ADDED
 =";T ELSE GOTO1
```

Michael Cress
Bridgetown, Nova Scotia

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

Picture Perfect Graphics Commands

By Robert C. Montowski

I have written two commands to use under OS-9 versions 1.00, 1.01, or 2.00 so that OS-9 users will have a quick and easy way to save and load graphics under OS-9. The commands are called `gload` and `gsave`. The commands act like the `LOADM` and `SAVEM` commands under RS Disk BASIC. No memory addresses are needed and you don't need to know the size or location of the graphics screen in memory. The commands do it all for you.

While I have supplied several different format pictures on the disk, I realize RAINBOW has no way to pass these pictures on to their readers. So I have written a procedure file called `makepix` that will not only draw a picture of some lines/circles; it will also show how the `gsave/gload` commands work. You can list the file to see how it works and also to be sure that you have all the correct commands in your `/d0/CMDS` directory for this procedure file to work.

The `gsave` command writes picture files out to disk in two possible formats. One is $180A bytes long and the other is $1800 bytes long. The $1800 size file is suitable for use under OS-9 with either the `gload` command, the BASIC09 graphics modules, OS-9 *Deskmate*, or OS-9 *Micro Illustrator*. The $180A size picture file can be copied to a Radio Shack CoCo format disk with either O-Pak's *Xcopy* or the `COPY` command. The picture file can also be Xmodem-ed across to any CoCo BBS and it will already be in the correct format to be loaded into memory under Disk BASIC.

The `gload` command can load pictures of several different formats. It can load in a Disk BASIC format picture that is $180A bytes long, a BASIC09 picture that is $1800 bytes long, an OS-9 *Deskmate* picture that is $1640 bytes long or an OS-9 *Micro Illustrator* picture that is $1800 bytes long. For picture formats shorter than $1800 bytes (*Deskmate*) you will see a blank space at the bottom of the screen. If a picture file is shorter than $1640 bytes, the `gload` command will terminate with an error.

The `gsave` command has two forms:

`gsave /d0/`*picture*	Saves picture in OS-9 format
`gsave + /d0/`*picture*	Saves picture in Disk BASIC format with extra header and footer bytes

The `gload` command has two formats:

`gload /d0/`*picture*	Loads in any OS-9 picture from BASIC09, OS-9, *Deskmate* or *Micro Illustrator*
`gload - /d0/`*picture*	Loads in any Disk BASIC picture and ignores the extra bytes in the file

When I say the picture is in Disk BASIC format I mean that it is a picture file with a length of $180A bytes — not that the picture is on an RS format disk! Pictures made under RS-DOS must be copied to an OS-9 format disk with either O-Pak's *XCopy* or BASIC's `COPY` command or the file/picture must be downloaded with an OS-9 terminal program and then saved to an OS-9 Disk.

Very simple animation can be done under OS-9 by `gload`ing several pictures one after another. If you are using O-Pak's Hi-Res screen or Xscreen's Hi-Res screen you can load pictures and use the text of those Hi-Res drivers for doing Hi-Res tutorials. The only limits to these commands are the user's imagination.

I can be reached by phone or on my OS-9 BBS (The Graphics Pub) at (215) 277-6951. The BBS hours are 7 p.m. to 7 a.m. EST.

(Questions about this article may be directed to Mr. Montowski at 1151 Sterigere Street, Apt. B-18, Norristown, PA 19403. Please enclose an SASE for a reply when writing.) ☐

Bob Montowski works at Norristown State Hospital in Pennsylvania. He runs an OS-9 BBS called the Graphics Pub and is presently learning assembly language and C under OS-9. His Delphi username is GRAPHICSPUB.

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The documentation for CBASIC is an 8 1/2 * 11 Spiral Bound book which contains approximatly 120 pages of real information.

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The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. Compare the performance of CBASIC against any Color Basic compiler. Dollar for dollar, CBASIC gives you more than any other compiler available. Requires 64K & Disk, not JDOS compatible.

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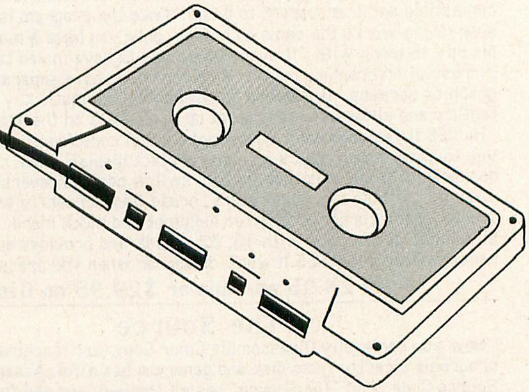

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Programs From Our Past Business Issues:

March 1986 — *Receipt File*, prints receipts and saves to disk for tax purposes; *CoCoflow*, a modified version of an icon-driven program to aid in drawing flow chart diagrams; *Rule of 78s*, determines early pay-off amounts on installment loans; *Cash vs. Financing*, a program that shows which way is the most economical for you; *Home Budget Analysis*, a program that assists in budgeting and forecasting personal finances; *Analyzer*, examines disk file structure; *Varlist*, a utility that lists program variables; *Marquee*, a utility that adds pizazz to title and menu screens; *Expense Tracking and Management System*, three programs that provide budgetary analysis for accounts; and *Mortgage Planner*, demonstrates how paying off a mortgage early is an advantage. Plus eight additional programs.

March 1985 — *EOQ Calc*, helps find the ultimate bargain for economic management; *Lurkley Manor*, a graphics Adventure game; *Payroll*, part one of a complete small business payroll package; *Home Financial Statement*, keeps track of home finances; *Landlord's Helper*, part one of a two-part series on managing rental property; *CFRR*, a finance program that analyzes prospects for good investments; *PERT*, an aid to project and estimate the efficient use of time; *T-Bill Computation*, computes the worth of treasury bills; *Convert*, figures foreign exchange rates; *Stock Index*, gauges stock market performance; *Joystick*, a tutorial on incorporating joysticks into programs; *Demon's Defiance II*, a mini arcade game; *Education Notes*, a lesson on how to formulate math solutions; and *Personable Pascal*, a tutorial on compiling a program in several smaller pieces.

Plus 17 programs from the **March 1984** issue of THE RAINBOW.

Listing 1: `gsave`

```
****************************************
* GSAVE
*
* An OS-9 command for saving a Pmode 4
* Hi-Res screen out to disk as a 6144 byte
* file.
* Before this command can be used you MUST
* use the display command from OS-9 to
* invoke the Hi-Res screen.
* You can do this like this:
* OS9:DISPLAY 0F 01 0F
*
* If doing this from Basic09 then you must
* call the Hi-Res screen with the line
* RUN GFX("MODE",1,15)...If there is
* no Hi-Res sceen present Gsave will exit
* with an error.
*
*
* Gsave can save pictures out to disk in
* 2 formats:
* If the picture is to be used again with
* Basic09, Micro-Illustrator, or Deskmate
* than you save the picture out to disk with
* this line:
* OS9:Gsave   /d0/picture.name
*
* If the picture is to be used under RS Disk
* Basic and you are going to Xmodem it to a
* BBS or use OPAk's XCOPY to get this file
* onto a RS Dos disk than you save the picture
* to disk like this:
* OS9:Gsave + /d0/picture.name
* This will save the picture to disk with an
* additional 10 bytes added to the file that
* are needed under RS Disk Basic to know where
* to load the picture into memory.
*
****************************************
* To get rid of the Hi-Res screen under OS-9
* all you need to do is:
* OS9:display 12
*
* From Basic09 you can get rid of the Hi-Res
* screen with:
* RUN GFX("quit")
****************************************
* NOTE
*
* Gsave will only save out a standard size
* Pmode 4 picture screen.  It will not save
* out a double screen that is considered
* standard under CoCo MAX.
*
****************************************
* Bob Montowski
* Apt. B-18 1151 Sterigere St.
* Norristown, Pa.  19403
* 215-277-5951
* CIS:71615,531
****************************************
          ifpl
          use         /h0/defs/os9defs
          endc
type      set         prgrm+objct
rev       set         reent+3
          mod         glend,glnam,type,rev,glent,glsize
glnam     fcs         "GSAVE"
edition   fcb         6
          org         0
gpath     rmb         1
temp      rmb         2
gscreen   rmb         2
flag      rmb         1
stack     rmb         200
glsize    equ         .
er        fcc         /GRAPHICS NOT KICKED IN YET.../
          fcb         10,13
erl       fcc         /FILE COULD NOT BE OPENED/
          fcb         10,13
er3       fcc         /ERROR WHILE WRITING TO FILE/
          fcb         10,13
ghead     fcb         $00,$18,$00,$0E,$00
gtail     fcb         $FF,$00,$00,$A0,$27
glent     stx         temp,u
          ldb         #0
          stb         flag,u
          ldx         $00
          lda         #1
          ldb         #$12
          os9         i$getstt
          bcs         error
          stx         gscreen,u
          ldx         temp,u
loop      lda         ,x+
          cmpa        #32
          beq         loop
          cmpa        #'+
          bne         loop2
          ldb         #1
          stb         flag,u
          bra         loop
loop2     leax        -1,x
          ldb         #3
          lda         #2
          os9         i$create
          bcs         errorl
          sta         gpath,u
          ldb         flag,u
          cmpb        #1
* The picture being saved is a RS Disk Basic
* picture.  Write 5 header bytes out to disk
* first...
          bne         os9pix
          lda         gpath,u
          ldy         #5
          leax        ghead,pcr
          os9         i$write
          bcs         error3
os9pix    ldx         gscreen,u
          lda         gpath,u
          ldy         #6144
          os9         i$write
          bcs         error3
          ldb         flag,u
          cmpb        #1
* Picture is a Rs Disk Basic picture
* and need these last 5 bytes added
* for Disk basic to know where to place
* picture in memory
          bne         finish
          ldy         #5
          leax        gtail,pcr
          os9         i$write
          bcs         error3
finish    lda         gpath,u
          os9         i$close
          clrb
          os9         f$exit
error     leax        er,pcr
          bra         out
errorl    leax        erl,pcr
          bra         out
error3    leax        er3,pcr
*
* ALL ERROR MESSAGES ARE WRITTEN TO
* STANDARD ERROR OUTPUT... >>  SO YOU
* CAN REDIRECT THIS OUTPUT (PATH 2) TO
* A PRINTER OR DISK FILE AND NOT INTERFERE
* WITH THE HI-RES SCREEN
*
out       lda         #2
          ldy         #200
          os9         i$writln
          os9         f$exit
          emod
glend     equ         *
          end
```

Listing 2: `gload`

```
****************************************
* Gload
*
* An OS-9 Command for loading in a Pmode
* 4 Hi-Res screen into memory.  Before
* this command can be used...You MUST...
* use the display command from OS-9 to
* invoke the Hi-Res screen.
* You can do this like this:
* OS9:DISPLAY 0F 01 0F
*
* If doing this from Basic09 then you must
* call the Hi-Res screen with the line
* RUN GFX("MODE",1,15)...If there is
* no Hi-Res sceen present Gload will exit
* with an error.
*
* Gload can load in two types of Pmode 4
* pictures.  If the pictures was created
* with Micro-Illustrator or OS-9 Deskmate or Basic09
* than you can load those pictures like
* OS9:Gload /d0/picture
* If the picture is a binary picture in
* Radio Shack format and you have down-
* loaded it with an OS-9 Terminal program
* than there are extra bytes in the file
* that are not needed.  To get this pix
* into memroy call Gload like this:
* OS9:Gload - /d0/picture
*
****************************************
* NOTE
*
* Gload will only load pix made with
* either OS-9 Basic09, OS-9 Deskmate,
* OS-9 Micro Illustrator, or a PMODE 4
* pix that has been download via XMODEM
* to an OS-9 Disk.  It will not load
* double size pix made by CoCo MAX...
*
***************************************
* Bob Montowski
* Apt. B-18 1151 Sterigere St.
* Norristown, Pa.  19403
* 215-277-5951
* cis:71615,531
***************************************
           ifpl
           use        /d0/defs/os9defs
           endc
type       set        prgrm+objct
rev        set        reent+3
           mod        glend,glnam,type,rev,glent,glsize
glnam      fcs        "GLOAD"
edition    fcb        4
           org        0
gpath      rmb        1
temp       rmb        2
gscreen    rmb        2
temp2      rmb        5
flag       rmb        1
stack      rmb        200
glsize     equ        .
er         fcc        /GRAPHICS NOT KICKED IN YET.../
           fcb        10,13
erl        fcc        /FILE COULD NOT BE OPENED/
           fcb        10,13
er3        fcc        /FILE IS NOT A PICTURE FILE/
           fcb        10,13
glent      stx        temp,u
           ldb        #0
           stb        flag,u
           ldx        $00
           lda        #1
           ldb        #$12
           os9        i$getstt
           bcs        error
           stx        gscreen,u
           ldx        temp,u
loop       lda        ,x+
           cmpa       #32
           beq        loop
           cmpa       #'-
           bne        loop2
           ldb        #1
           stb        flag,u
           bra        loop
loop2      leax       -1,x
           lda        #1
           os9        i$open
           bcs        errorl
           sta        gpath,u
           ldb        flag,u
           cmpb       #1
           bne        os9pix
           lda        gpath,u
* Read in the first 5 bytes of the file...These
* are not part of the actual picture
           ldy        #5
           leax       temp2,u
           os9        i$read
           bcs        error3
os9pix     ldx        gscreen,u
           lda        gpath,u
           ldy        #6144
           os9        i$read
           cmpy       #$1640
* A normal picture is $1800 bytes long and a
* Deskmate picture is $1640 bytes long.
* if the read pulls in less than $1640 bytes
* than the file is >>NOT<< a picture file!!!
* and an error is generated by Gload
           blt        error3
*  IF THE FILE YOU ARE ATTEMPTING TO READ
* IN IS A DESKMATE .PIC FILE THE I$READ WILL
```

```
* GENERATE A EOF ERROR AS THE DESKMATE .PIC
* FILE IS SHORTER THAN 6144 BYTES LONG...BUT
* THIS IS STILL OK...ALL THAT WILL HAPPEN IS

* THE BOTTOM OF THE HI-RES SCREEN WILL REMAIN
* EMPTY....

           lda        gpath,u
           os9        i$close
           clrb
           os9        f$exit
error      leax       er,pcr
           bra        out
errorl     leax       erl,pcr
           bra        out
error3     leax       er3,pcr
*
* ALL ERROR MESSAGES ARE WRITTEN TO
* STANDARD ERROR OUTPUT... >>  SO YOU
* CAN REDIRECT THIS OUTPUT (PATH 2) TO
* A PRINTER OR DISK FILE AND NOT INTERFERE
* WITH THE HI-RES SCREEN
*
out        lda        #2
           ldy        #200
           os9        i$writln
           os9        f$exit
           emod
glend      equ        *
           end
```

Listing 3: `makepix`

```
LOAD GLOAD GSAVE
LOAD ECHO DISPLAY SLEEP
DISPLAY 0F 01 0F
DISPLAY 14
DISPLAY 16 24 24
DISPLAY 1A 0A
DISPLAY 16 32 32
DISPLAY 1A 0A
DISPLAY 16 50 50
DISPLAY 1A 0A
DISPLAY 16 70 70
DISPLAY 1A 0A
GSAVE /D0/CIRCLES
DISPLAY 12
DISPLAY 0C
ECHO WE SAVED A PICTURE TO DISK
ECHO AND WE WILL NOW LOAD IT BACK
ECHO IN TO PROVE THE GSAVE AND GLOAD
ECHO COMMANDS WORK
ECHO FIRST WE'LL SLEEP ABOUT 5 SECS.
SLEEP 500
DISPLAY 0F 01 0F
GLOAD /D0/CIRCLES
SLEEP 500
DISPLAY 12
ECHO IT WORKS...
```

Hint . . .

Pointed Statements

Here are some more CoCo 3 tips! To find the current line number that is pointed to by the `ON ERR` statement, enter the following line:

```
PRINT PEEK(&HFE0E)*256+PEEK(&HFE0F)
```

To find the line number currently pointed to by the `ON BRK` statement, enter this line:

```
PRINT PEEK(&HFE0C)*256+PEEK(&HFE0D)
```

Bob Rosen
Howard Beach, NY

Variety is the spice...

MAX FONTS 1, 2, 3 or 4 Each set contains 24 fonts that are professionally designed and ready to use with CoCo MAX I or II. Each set includes a custom "pull down menu" that is used by CoCo MAX for selecting the fonts. Just "click" and use the same as any other font with CoCo MAX. Send a SASE for samples of all the fonts!

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TABLEAU
Victory
Baby Teeth Small
BABY TEETH LG.
BOBO BOLD
BOOKS
Cartwheel
Fine Print
Normande Small
Normande Medium
NORMANDE LG.
Piano
SINALOA
sukiyaki

SET 2

BLOCK UP
Harlow
Koloss
maharajah
MUSKEGO
Peignot Small
Peignot Large
PROGRAM SMALL
PROGRAM MEDIUM
PROGRAM LARGE
ROCK&ROLL
Futura Black Small
FUTURA BLK. LG
HANG UP
KEYBOARD
LIQUID CRYSTAL
Мосцоя Смалл
Мосцоя Ларге
ORBIT
POINT OUT
Printout Small
PRINTOUT LARGE
STOP

SET 3

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Bocklin
Broadway
BROADWAY ENGR.
Dot Matrix
𝄞 ♩ ♪ ♫
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PIONEER
URBAN
Xerxes Small
XERXES MEDIUM
XERXES LARGE
celtic
HARTLAND
Script
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CINEMA
ebony
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METAL
Odin
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Cirque
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Schwer
Square
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TELEWRITER-64 The word processor that has lead the way for over half a decade. Check out Cognitec's ad in this issue for all the features! Interface graphics with it using TELEGRAPHICS—included FREE!

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SIDE WISE makes your printer do something you never thought possible—print sideways! SIDE WISE will read ASCII text files generated by your spread sheet program and print them down the page instead of across. This allows you to indicate a printer width of up to 255 characters! No more having to hold 2 or 3 pages together to get the entire picture of your work sheets. Compatible with DYNACALC and ELITE CALC. Included FREE with DYNACALC! Not compatible with Spectaculator.

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Continued from Page 10

- I would like to bring to the attention of all RAINBOW readers the following list of BBSs. All are affiliated with the California Computer Federation, but are open to use of everyone. All boards operate 24 hours a day.

Presidio BBS, San Francisco
(415) 567-3287
Redwood Gatorboard, Redwood City
(415) 364-6630
Colorboard of San Francisco
(415) 591-7366
Vallejo Colorboard, Vallejo
(415) 557-9221
Los Altos Colorboard, Los Altos
(415) 965-7949
Hal 2001, San Mateo, (415) 345-1802
East Bay CoCo Hangout, Oakland
(415) 530-2444
San Bruno CoCo BBS, San Bruno
(415) 877-8141
Colornet, Burbank, (818) 840-8903
L.A. Color Users Board, Los Angeles
(213) 773-3024

If you have questions concerning these California Computer Federation BBSs, contact Dan Eckert (415) 567-3287 (Presidio BBS).

Dan Eckert
San Francisco, CA

- I have a CoCo modem and would like to communicate with someone in the Denver area. Call (303) 650-6035.

Fred Schmidt
3966 Shaw
Westminster, CO 80030

- The Village CoBBS is online in Cromwell. We support 300/1200 baud, 24 hours a day. Call (203) 635-1401.

Bartlett B. Shattuck
46 R. Geer Street
Cromwell, CT 06416

- I would like to announce the White House Colorama V.300 BBS. It has downloads, boards and more; 300 baud. Call (305) 799-0784.

Lance Easley
Cocoa Beach, FL

- The Dreamland Express BBS is up and running at (904) 686-0094 featuring original software, four message boards, plus one board dedicated to the CoCo. Also featuring a full CoCo download menu and text files. It's worth a long distance call from anywhere.

Charles Opperman, SysOp
4497 Crescent Road
Spring Hill, FL 33526

- I would like to announce one of the newest BBSs in the central Indiana area called The Gator Board at (317) 482-1079, online from 10 p.m. to 8 a.m., seven days a week, operating at 300/1200 baud. It offers one club and six public SIGs, up/downloading, a voting booth, nine news files and the usual private and public message bases. One main attraction is the music SIG containing top ten lists for all kinds of musical tastes, concert updates (for our area) along with album, C.D. and stereo equipment reviews.

Derk Gates, SysOp
307 N. Grant Street
Lebanon, IN 46052

- The Duke's Shelbyville Colorama has been online for over one year. It runs 24 hours a day, seven days a week, and its features include: message base, online program and games, downloading, screen pause and other well-known Colorama features. The communications protocol is 300 baud, 7 bit, even parity, 1 stop bit. Call (317) 392-2769.

Duke Norris
P.O. Box 241
Shelbyville, IN 46176

- I would like to announce the M&M Electronics BBS in Winnfield. New users are welcome. Call (318) 628-2087 after 7 p.m. (Central time), Monday through Friday. Voice (318) 628-6434.

Keith Guillotte
P.O. Box 194
Joyce, LA 71440

- Experience the Launching Pad BBS in Baltimore. Now operating at 300/1200 baud, 24 hours a day, seven days a week. Featuring plenty of CoCo downloads and several message bases. Call (301) 661-1826.

Tom DiMarco, Jr.
9502 Perry Hall Blvd.
Baltimore, MD 21236

- The Graveyard BBS is a multi-purpose system that includes: online games, X-modem downloads, multiple message bases and E-mail. It runs on a 64K CoCo with three disk drives and a Hayes 1200 baud modem. The BBS operates 24 hours a day at 300/1200 baud. Call (617) 792-0381.

Glenn May
192 Oak Street
Shrewsberry, MA 01545

- The GOSUB TRS-80 Computer Club has a BBS that operates 24 hours a day at 300/1200 baud. Call (617) 756-1442.

Ed Donovan, SysOp
357 June Street
Worcester, MA 01602

- We are pleased to announce the Instant CoCo BBS. Hours are 10 p.m. to 7 a.m. weekdays and 10 p.m. Friday to 7 a.m. Sunday. We are 300/1200 baud, 7 bit, even or 8 bit, none and 1 stop bit. The board is FIDO running on a Tandy 1000. We have several download sections and a reading room. There are message sections for general and technical help. Call (614) 870-6544.

Robert E. DeBolt
9667 Taylor Court
Pickerington, OH 43147

- The Toledo area Colorama BBS serves most of northeast Ohio. We operate at 300 BPS (soon to be 1200) 24 hours a day. Phone (419) 877-0694 or BBS (419) 877-5556.

John Kendzrara
6016 Kathy Drive
Whitehouse, OH 43571

- I am disappointed I have not found a BBS around the Oklahoma City area yet. If anyone has a BBS please put down the baud rate and parity and the number and send it to me.

Patrick Wamhoff
1024 Big Oak Drive
Midwest City, OK 73110

- The Hideaway BBS runs 24 hours a day, seven days a week, 300 baud, 7-n-1. Call (405) 598-6113. We feature a message base, online games, downloads, an advertising section, plus a whole lot more.

Jeff Cahill
Route 1, Box 110
Tecumseh, OK 74873

- The ASCII-80 BBS is online 24 hours a day for telecommunication callers. Call (215) 252-1608.

Nevin Keller
136 S. 15th Street
Easton, PA 18042

- I am running an OS-9 PBBS system with PBBS software 4.2 at (215) 277-6951. The BBS runs from 7 p.m. to 7 a.m. EST. It runs at 300/1200 baud, has four message bases, nine download areas and over 10 megabytes of hard disk storage space. The BBS runs under a 256K RAM disk and is very fast. All those interested in graphics or OS-9 or just looking for a friendly place to talk with other CoCoites. Call the Graphics Pub.

Bob Montowski
B-18 1151 Sterigere Street
Norristown, PA 19403

- I am pleased to announce the CoCo SIG on Dragnet BBS in Harrisville. It runs 24 hours a day at (401) 568-2343.

Eric G. Robichaud
10 Stoneham Drive
Woonsocket, RI 02895

- This is to announce a new BBS in the Greenville-Spartanburg area. The Boardwalk BBS runs at 300/1200 baud, 24 hours a day, 7 bit word, even parity, 1 stop bit. Features CoCo downloads, text files, message base and online games. Supports the CoCo 1, 2 and 3. Being a computer marketing representative with the Radio Shack Computer Center in Greenville, I have lots of advance notice about CoCo goings on. Call (803) 271-9243, everyone is welcome to call.

C.W. Gordon, SysOp
Greenville, SC

- CoCo Palace BBS now operates under 4.0 Colorama. I have added another 180K of storage and have multiple downloads and security levels, as well as special user input files that are ongoing. It also features a voting section that has a new topic each month. Call (615) 581-9752.

Another new BBS in Morristown is the Great White North. Phone (615) 587-0051. The SysOp is McPhail Hunt.

Marty Cline
936 Hall Drive
Morristown, TN 37815

- Announcing the Computech-80 BBS, running 300 baud, 24 hours a day Monday through Sunday, 7- or 8-bit words, all access is free. Multiple computer forums available, and lots of downloads for CoCo. Call (703) 365-2018 or write.

Ricky Sutphin
Route 1, Box 20
Henry, VA 24102

- The CoCo Beach BBS has been running for a year. Colorama software, 1200 baud, 7 bits, even parity, one stop bit, 15 megabytes disk storage half-filled with public

When You're Running Hot, It's Time for a Change

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

I have a CoCo 2 with Extended BASIC, *but only 16K of memory. It has reached the point where I must upgrade my CoCo to at least 64K. I also have a problem in that after about 30 minutes of computer operation with either* Scripsit *or just in the command mode, the components below the slotted air intake on the top left get very hot. When this happens, the words on the screen start misspelling themselves. I need to know the easiest and possibly cheapest way to cure both of these problems.*

Ken Banghart
Redlands, CA

℞ Ken, upgrade techniques depend upon the model of the machine. In his "Earth to Ed" column in the March and April 1985 RAINBOWs, Ed Ellers covers how to upgrade Korean-manufactured CoCo 2s. If yours is one of the earlier, American-made CoCo 2s, refer to his "RAM/ROM Upgrade Roundup" in the May 1984 issue. But, with your overheating problem compounding the situation, I think you would be better off cutting your losses and buying a new CoCo 3.

Changeable Character Set

Is there any software available that would allow me to change the character set on my 64K CoCo 2?

Kevin Callis
Alberta, VA

℞ Computerware, Box 668, Encinitas, CA 92024, (619) 436-3512, sells a machine language program called *Screen Expander*, Kevin. It uses the high resolution display screen to generate a new character set.

A New Keyboard for CoCo

I'm considering purchasing a keyboard for my old gray 'E' board CoCo 1. I am quite satisfied with CoCo's original keyboard layout and have no need for special function keys. Could I purchase Tandy's replacement keyboard kit (Catalog No. 26-3016, $39.95) and install it myself?

David Turk
Richland Center, WI

℞ Installing a keyboard is simple enough, David, but be sure that they supply you with an adapter, because the old gray Color Computers (those with 'C', 'D' and 'E' boards) used a wire cable instead of the mylar one which is used on the newer machines.

Bugged by *ZBUG*

I'm 15 years old and am trying to learn assembly language after two years of experience with BASIC. *I purchased the* EDTASM+ *program and have been having some problems executing programs in* ZBUG. *One problem that I have had is that when I try to execute a program in* ZBUG, *it hangs up and resets the program. Is this a problem with the program or with the editor? Is there a program for* EDTASM+ *which turns object code into the editor's source code?*

Wayne Facer
Chiloquin, OR

℞ The problem is with your program, Wayne. When you program in BASIC, you are using a built-in interpreter; the interpreter systematically scans each line for errors and, if it is correct, translates the line into machine language which it then executes. If the line is incorrect, the program halts and an appropriate error message is displayed. When you program in assembler or machine language, no such error checking is done, so if you make a logic error in your code, the odds are that the machine will lock up or do a reset. Unfortunately, the only thing you can do is to save the source code before assembling so that you can make corrections and try again. *ZBUG* allows you to disassemble small portions of code and there are more sophisticated disassemblers available from advertisers in the magazine. The most difficult part of the disassembly process

---

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

domain software. First log on restricted, mail privileges, no download restriction.

Jim McCracken
1208 Montana Court
Virginia Beach, VA 23456

- The Bellingham BBS is up and running. Call (206) 734-5806 between 21:00-07:00 Monday through Sunday.

Roger Alexander
Bellingham, WA

- Eskimo North is a BBS for CoCo enthusiasts and users of other Tandy machines. Supports Xmodem file transfers, and can have four users online at a time. It runs on a Tandy Model 16B with the XENIX operating system. Open 24 hours a day at 300/1200 baud. Call (206) 367-3837.

Brian Wright
Seattle, WA

- Announcing the existence of the B.U.G. Board BBS. This is a club board (Bonnyville User Group) and it is necessary to become a member for full access to this board. It is a Colorama board and runs on a 64K CoCo with two single-sided disk drives, 24 hours a day. Call Data (403) 826-6266 or Voice (403) 826-4790.

Gerhard Wolf
Bonnyville, Alberta

- I would like to announce the Public BBS System of Shaughnessy. The number is (403) 381-3417. The system is running 24 hours a day under OS-9 with PBBS 4.2 software using a 64K CoCo 2 with multipack, hardware clock, parallel printer port, deluxe RS-232 Program Pak, D.P. Johnson's 512 Ram Card, and three 80-track double-sided drives. The BBS supports 300/1200 baud. There are six download directories for BASIC programs, OS-9 programs, OS-9 assembly programs, OS-9 patches, text files and merchandise. No password is required. Please log on and see.

Dieter G. Rossmann
P.O. Box 24
Shaughnessy, Alberta
Canada T0K 2A0

- The Micro Ads BBS has a new number (604) 765-1578, Monday through Friday, 10 p.m. to 8 a.m. PST, 300 baud, 8 data, 1 stop, no parity. I am developing a new section for automatic weather information and, at present, only have the light detector working. I would like to ask anyone who is in the know, to contact me in regards to adding a windspeed/direction, temperature, rain indicator and perhaps a more reliable clock circuit to the joystick ports for data acquisition.

David Coldwell
RR 2, Suite 14A, Comp. 13
Kelowna, British Columbia
Canada V1Y 7R1

- I would like to inform everyone in the southern Ontario region that the Essa Color Computer Club of Barrie is now operating a BBS at (705) 728-2765. The system is run on a CoCo 2 with a 15-Meg hard drive and includes such things as messages, up/downloads and mail. Also the Essa Color Computer Club welcomes all new members. We meet twice monthly at St. Mary's School in Barrie. For more information call (705) 726-2814 or write to me.

Doug Morrow
2-60 Burton Avenue
Barrie, Ontario
Canada L4N 2R6

- The Information Station BBS supports 300/1200/2400 baud, 8 bit, X-Modem, no parity, auto-halt, up/downloads, online games, stock market simulation, casino, dedicated CoCo message base, private mail and general message bases. Applications to the system can be made on your first log on and are usually approved within 24 hours. Call (519) 455-0187

Wayne Morrison
1089 Chippewa Drive
London, Ontario
Canada N5V 2T8

- This is to announce our French BBS, the Le Babillard du Club CoCo La Tuque Inc. Call (819) 523-4329; when you get the link, press ENTER. It is open 24 hours a day, 7 days a week, speed 300 baud. To become a member, leave a message to PMP, on the BBS, or write to me.

Pierre Lortie
C.P. 458
La Tuque, Quebec
Canada G9X 3P4

- I'd like to announce a new BBS called CoCo Line. Call (514) 669-3031. Open 24 hours a day, 7 days a week. The BBS is a French board.

Daniel Lesage, SysOp
Montreal, Quebec

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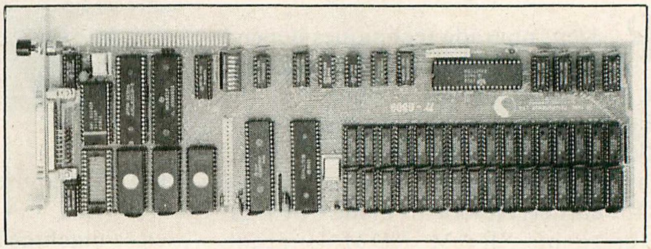

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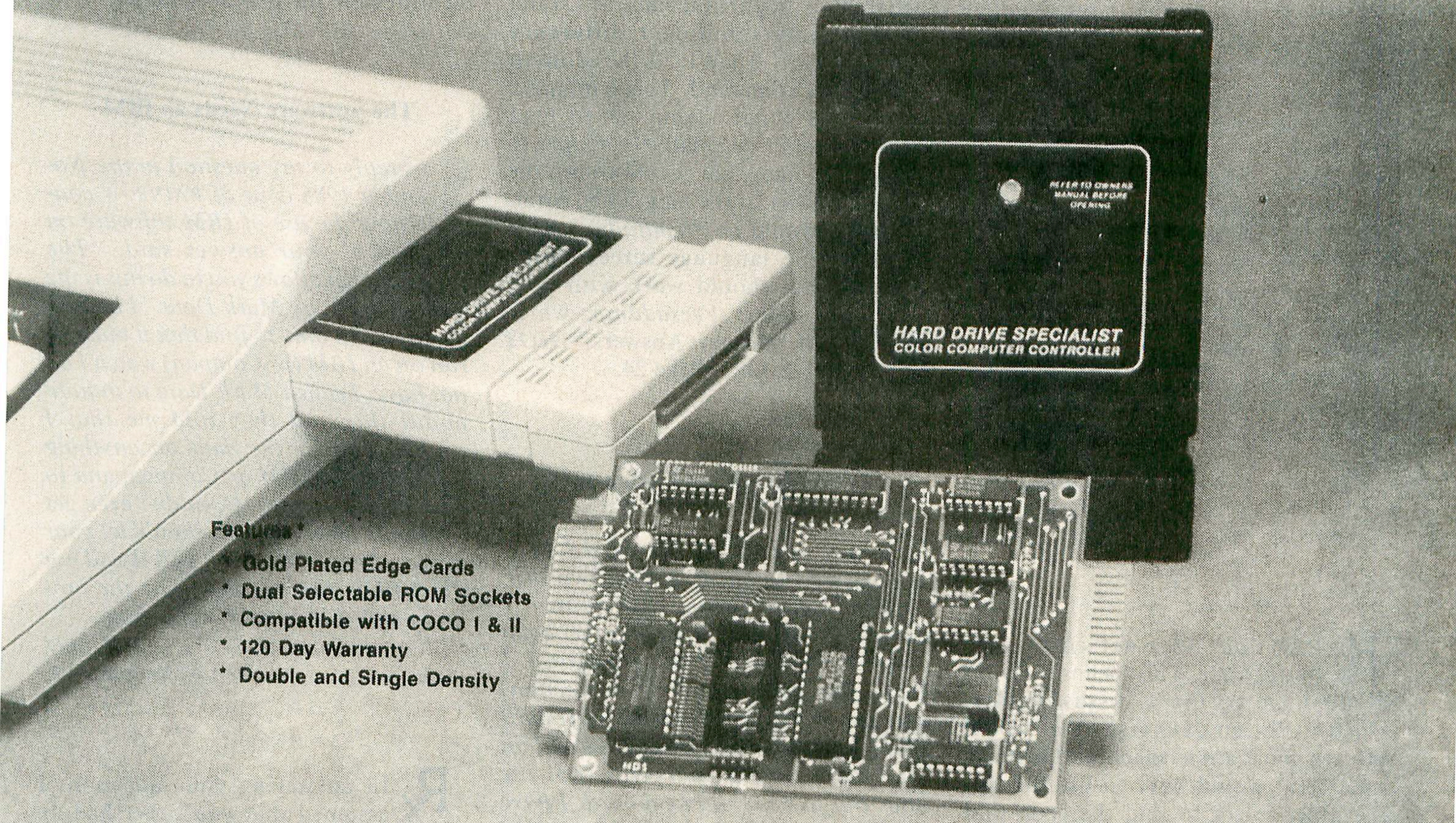
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is distinguishing between code and tables or data.

Double-Precision Arithmetic

I would like to be able to use double-precision arithmetic on my CoCo 32K with Extended Color BASIC *1.1, RS-DOS 1.1. Do you know of any machine language programs available that would give me this capability? I have heard that* VIP Calc *has such capability. Using* EDTASM+ *(tape) I think I could find the section related to double precision arithmetic, but I would need a printout of* VIP Calc. *Do you have a patch to make this printout possible? My goal is to obtain as exact solutions as possible and I would gladly sacrifice operating time for the increased accuracy.*

Willard Conner
Chadds Ford, PA

℞ *VIP Calc* does not come with source code. This means that you would have to use a dissassembler, which is not an easy task. You would have to have some machine language savvy, and would have to use the disassembler to try to find the code that performs the calculations desired. Even distinguishing between code and data is a difficult task at times. A better way to obtain the accuracy that you desire, Willard, would be to write the code using the C language. In order for you to use C, though, you will need to operate under OS-9. Another way for you to obtain accurate solutions would be to write the code using *XBASIC*, under FLEX. Both of these environments require at least 64K of memory. You said that you had 32K, but if you have an 'F' board, you may really have 64K.

DOS Determination

How can I tell what DOS my Color Computer is using? I have a DMP-105 printer and a couple of my friends have DMP-110 printers. Do you know of any screen dump one-liners that we can use with our printers?

Paul Dumin
Southington, CT

℞ To date, Paul, Radio Shack has supplied only DOS versions 1.0 and 1.1. The version that is loaded into your machine will appear on your screen when you turn on your computer. If you have a CoCo 3, the version will either appear as DOS 2.0 or DOS 2.1, even though they are the same as 1.0 and 1.1. The only significant difference between DOS 1.0 and 1.1 is the addition of the DOS command. This command enables the Color Computer to load OS-9. It would be relatively simple to write a one-liner that would dump the screen to either of the mentioned printers, but it would be *dreadfully* slow. A fast machine language screen dump program that should work with your printers is called *Versadump*, which appeared in "Printer Answers," *HOT CoCo*, March 1985, Page 24.

Travel Keyboard Connector

I have a CoCo 1 'D' board 32K, upgraded to an 'E' board, two disk drives and a Gemini 10X printer. I have two problems that have been driving me crazy. I have a CoCo 1 keyboard (pin and cable connection) and an excellent full travel keyboard that a friend gave me. It has a flat ribbon that slides into a connector, not the plug/pin like my old keyboard. I have not been able to find an adapter that would allow me to connect the new keyboard to my CoCo 1. I've tried placing the ribbon on top of the pins and clamping them together, which gives me about 90 percent of the keys, but if the keyboard moves even a nanometer I have to reclamp it and start all over. Radio Shack has not been able to help me in my search for the adapter, can you? I also have the Radio Shack graphics software. What can I buy that would allow me to print out the pie, bar and scatter charts on my Gemini printer? Is this software only compatible with Radio Shack printers? I bought a screen dump program, but it doesn't seem to work with the Radio Shack graphics.

Larry Pistelli
Fountain Valley, CA

℞ For the adapter that you require, Larry, contact Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414, (718) 835-1344. Explain that you need an adapter that connects a new-type keyboard to the older CoCo 1 machine. These adapters are a Tandy product that were distributed for keyboard upgrades when the CoCo 2 was introduced. For the screen dump desired to print the pie, bar and scatter charts, see the *Versadump* program mentioned in the previous answer.

The Software Needs an IBM

In reply to my question in the November 1986 issue of RAINBOW *concerning the use of IBM software on my CoCo, your answer said, "The program that allows you to do this is the* CoCo Util II, *by Mark Data." I bought the program only to find that it must be run on an IBM (or Compaq) which I do not have. I called Mark Data to inquire about this and they told me that I cannot transfer the data on anything other than an IBM or Compaq, and to add insult to injury, I couldn't even get a refund! I feel that you should let your readers know that* CoCo Util II *will not do the job, before others buy the program and discover the same thing.*

A. Obner
Hendersonville, NC

℞ In answering your question, I assumed that you either had an IBM-compatible machine or had access to one. Otherwise, why would you have IBM software? The advertisement for the *CoCo Util II* program in this magazine (see Spectrum Projects, Inc.) states "Requires 128K MS-DOS Computer W/2 Disk Drives." *CoCo Util II* is designed for the person who has access to an IBM-compatible machine. IBM software is usually written and read on both sides of a disk, 40 tracks per side, nine sectors per track and 512 bytes per sector, whereas the CoCo can normally only access one side of a disk containing 35 tracks, 18 sectors per track and 256 bytes per sector.

When using the *CoCo Util II* program, you would first need to format a CoCo disk, then insert the formatted CoCo disk into the IBM-compatible machine and copy an ASCII file to the CoCo disk. You could then edit the file on your CoCo, and later transfer the file back to the IBM-compatible machine in a similar fashion.

Be alerted that only high-level source code saved in ASCII can be transferred. Neither the *CoCo Util II* program nor any other is designed for the person who wants to buy IBM software and use it on the CoCo unless, of course, the source code is supplied, but this situation is quite rare. It is designed for the person who, perhaps, uses an IBM-compatible machine at work and wants to edit the same files at home, then take them back to work.

Any IBM-compatible machine can transfer the disks using the *CoCo Util II* program. If you want to transfer IBM PC programs written in BASIC and saved in ASCII to your CoCo you can use one of several methods. D.P Johnson, 7655 S.W. Cedarcrest Street, Portland, OR, markets *PC/XFER Utilities*, $45. *PC/XFER* also requires *SDisk*, $29.95, marketed by the same company. To use *PC/XFER Utilities*, you pipe the standard input/output to/from the single-sided PC/MS-DOS disk. You can also refer to Marty Goodman's "Transfer CoCo Text Files to MS-DOS Disks" in the June and July 1985 issues of THE RAINBOW.

Bar Code Reader

Is there a bar code reader wand with corresponding hardware and software that would allow me to read data in, and print bar codes with a DMP-105 and/or DMP-500 Radio Shack printers, under CoCo 2 control?

Jose Pedro Alberti
Argentina

℞ Radio Shack markets the wands, bar code drivers and read/write software only for the model 100/102/200s. In order to use these wands on your Color Computer, you would have to design your own hardware adapters and write your own software to convert the Model 100 system to your CoCo.

JDOS-CoCo 3 Incompatibility

I am a longtime CoCo 'F' board user who recently acquired one of the first CoCo 3s at the RAINBOWfest. So far, I've found that the machine has great potential, but it's giving me some initial heartburn. I have two disk controllers, J&M and HDS, each with two ROM chips, giving me JDOS 1.2, RS-DOS 1.0 and RS-DOS 1.1. When running with disk, all of the CoCo 3 commands seem to disappear. For example, the `WIDTH` *command gives a Syntax Error. What do I have to do to achieve successful CoCo 3 disk operation? What can I do to achieve successful CoCo 2 emulation running a CoCo 3 as a disk system? Also, How do you get* Telewriter-64 *to work on the CoCo 3?*

Col. H.L. Elman
Port Jefferson Station, NY

℞ JDOS is not compatible with the CoCo 3. If you want an alternate DOS with additional capabilities, be on the lookout for ADOS3, by Spectrosystems, 11111 N. Kendall Drive, Suite A108, Miami, FL 33176, (305) 274-3899. It might already be on the market by the time you read this.

As far as CoCo 2 emulation is concerned, if you mean you want the CoCo 3 to boot up and indicate Disk Basic 1.x instead of 2.x, then type `POKE&HFFDE,0: POKE&H71,0: EXEC&HA027`.

If your *Telewriter-64* does not work, I assume that you have an older version, which has problems with improper response to the keyboard. In your disk version of *Telewriter-64*, add the following lines to the program *U/BAS* and replace its Line 200 with the line below.

```
200 LOADM"TW64",OF:GOSUB 500
   :POKE386,57:IF(SW) GOSUB 330
500 P1=PEEK(&HA000):P2=PEEK(&HA
   001)
501 POKEOF+7931,P1: POKEOF
   +7932,P2
502 POKEOF+8210,P1: POKEOF
   +8211,P2
503 POKEOF+9845,P1: POKEOF
   +9846,P2
504 POKEOF+13783,P1: POKEOF
   +13784,P2
505 POKEOF+14774,P1: POKEOF
   +14775,P2
506 POKEOF+15241,P1: POKEOF
   +15242,P2
507 IF PEEK(&HC004)=215 THEN
   POKEF+8929,202:POKE8930,103
508 RETURN
```

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

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Roboflip: Anatomy of a Game

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Since a number of people are very excited about the game and graphics possibilities of the new CoCo 3, this month we will review the basics of game-making by presenting a brand new Color BASIC game inspired by the letters and phone calls of a number of readers. In the following paragraphs I will unfold the story that led to the creation of this month's program: *Roboflip*.

Wishes? What Wishes?

During the last year and a half, the wishes submitted by many readers have been darn near impossible to grant. The original intention behind the "Wishing Well" was to have RAINBOW readers bounce ideas off me that could possibly be turned into working BASIC programs. Unfortunately, some readers have either requested programs that only one or two people in the entire world could use, or projects that could not be done in BASIC, even with 128K!

A number of readers have been requesting more games. Others have insisted that programs be made to work on the MC-10 as well. One such reader, Mr. Larry Haines, editor of the *MC-10 International User's Group* in Spokane, Wash., blasted me for suggesting that the MC-10 was dead. (Sorry, I only said I felt not many people were using it. I never said it was *dead*!)

Anyway, I felt this would be a good time to come up with a program that would still work on the MC-10 (with 20K). Prompted by Mr. Haines' request that I not abandon the MC-10, I started scratching my head to come up with something new.

At that point, I got on the phone to Tony Morris, co-owner of a new computer supply outlet in western Massachusetts, called Computer Food. I needed some repair work done on my line printer, so we got into a short conversation. Tony commented that his nieces were now using the 64K disk system he gave them and used a heavy dose of "Wishing Well" programs, such as *Math Driller* and *Color Change Quiz*. He also asked when some new games would be coming down the line.

"This is getting tough lately, Tony. No one has suggested any workable ideas for games lately. Everyone wants games, but I'm at a loss of what to come up with. Writing a new program each month for several years has taken its toll!"

"Oh, come on now," he answered. "There are a lot of things you could make for games. It doesn't have to be elaborate!"

"Oh yeah?" I replied. "What would you suggest?"

"What a about a game of Flip?"

"Flip?"

"Yeah, you remember playing Flip with baseball cards when you were a kid. Why not make a computer version?"

A computer game of Flip? I reflected that Flip was not such an old game, after all. It seems that every day I have to break up a game of Flip somewhere in the school building. (The only problem here is that most of the high school students I catch are playing Flip with dollar bills, with real money as the prize. This is forbidden in school!)

Now seemed like a good time to introduce a computer game of Flip. Maybe I could come up with an attractive game that would satisfy my students' desire to play the game, without involving any money, and also satisfy those who wanted a new CoCo game (including the MC-10 fans).

The result is *Roboflip*, a Lo-Res graphics version of the game I played as a kid on the grammar school playground. However, getting the game to work correctly was a much tougher task than I expected.

Writing the Game

What, you might ask, is so difficult about writing a game of chance? Just

---

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

> *"The computer has a very predictable way of generating random numbers."*

use the RND command, right? Not so simple, my friends. Those of you familiar with how a computer works will know that a computer does not generate true random numbers. Try this little test.

Turn on your computer, type the following and press ENTER.

```
FORI=1TO10:PRINT RND(10):NEXT
```

The screen will print out a string of random numbers. Copy them down. Now turn the computer off and on again. Repeat the same command again and compare the numbers on the screen with the numbers you wrote down. They are the same, aren't they!

The point is, the computer has a very predictable way of generating random numbers. Most users of the Color Computer will be familiar with the way to overcome this. Making a variable equal to the negative value of the `TIMER` resets the random number generator.

```
A=RND(-TIMER)
```

This is even more effective if placed inside a loop using the `INKEY$` command, which keeps resetting the value until the user responds to the keyboard.

This was not the major obstacle, however. The big problem was making the game "winable" or "loseable." If you flip a coin one hundred times, odds say you should get a 50/50 split nearly all the time. If I made each player's values too large, the game would eventually reach an equal point where neither one would win or lose. One player's losses would later be offset by the other's.

I got around this by giving each player only 10 cards. This number lets the game be completed within a reasonable amount of time. (No one wants to play Flip for half an hour!)

Once I got the program lines workable, I created a graphic to go along with the game. This type of game could be written with just text, but it would be a complete drag. Therefore, I designed two colorful robots who play the game. One is the player, the other is the computer. Using a number of `FOR-NEXT` statements and the `SET`, `RESET` and `PRINT@` commands, I was able to put together a simple animation that shows each robot shaking a set of colorful cards and then flipping them, thumbs up, into the air. The cards then gently flutter to the ground.

Sure, this could have been a Hi-Res game, but then it wouldn't work on Color BASIC CoCos or on the MC-10. I hope none of you are too spoiled by Hi-Res to ignore the many uses of the `SET` command and character strings. When working with very young children, a game like this in Lo-Res is much more effective and will hold the youngster's attention.

Playing the Game

On running the game, you will notice a slight variation on our "Wishing Well"

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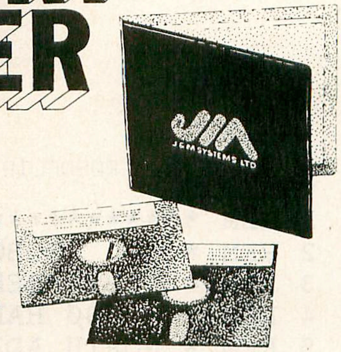

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title. I have only a few DATA lines that are used more than once with the RESTORE statement. This repeats our *Roboflip* title without duplicating lines. Pressing ENTER starts the game from the title page.

The screen creates two robots. The one on the left is you, and has a green head. The one on the right with the red head is the computer. At random, one of you will have the first "flip." If the computer goes first, he will just shake his hand and flip. If you go first, the screen will wait until you press the space bar to flip. Don't worry, the screen prompts you with directions as the game is played.

If the two cards are both green, like your robot, you win both cards. (You start with 10 cards apiece.) If both cards turn up red, the computer wins. If they split, the cards stay in the pot and you both flip again, in reverse order. The screen shows a number dead center, which is the number of cards in the pot. The next one to win a hand collects the whole pot. The number of cards is displayed above each player's head. If a player hits zero while there is a split, both players split the pot and continue until one player hits zero on a loss.

Sound simple? You will be surprised how frustrating the flipping can be when things are not going your way. The game can be interesting, especially for the very young who never played Flip with baseball cards.

Typing in the Game

For those of you who are new to the "Wishing Well," I will repeat a few standard points. Be sure to type in the DATA lines exactly as you see them. The commas are not a mistake. Also, if you see any lowercase letters in the listing, you must use SHIFT-0 to get into and out of the lowercase mode. The letters appear as a reversed black block on the screen, which looks very attractive once you get down to playing the game.

MC-10

There is only one change that is required when you type in this listing. The MC-10 doesn't have a TIMER function, so you should replace the command TIMER with some large number, say 9999, instead. This will give you a random appearance when in the INKEY mode. Make this change anywhere in the listing where you see -TIMER.

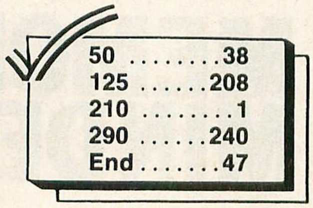
New Challenges

As this year progresses, I would really like to develop some elaborate games, preferably with an educational application. When it comes to Adventures, I don't usually have a good idea to start with. Therefore, I am going to issue a challenge.

If you have a theme you would like to see used for a game, drop me a line with your idea. Be as specific as possible. If you can think of a way to have it include an educational task, suggest that too. If your idea is good, I will even include your name or names in the title card, which I haven't done in the past. Get these in the mail to me c/o THE RAINBOW or to my home address (60 Harding Avenue, N. Adams, MA 01247). Please don't expect a written response — I don't have the time for computer pen pals, as much as I would like to.

Conclusion

This program was short and simple, but for those of you just starting out or with young children, it will be a good way to get your feet wet. I hope you enjoy the game. In return, I hope to receive an avalanche of valuable suggestions. Either way, you will be the winners. ☐



50	38
125	208
210	1
290	240
End	47

The listing: ROBOFLIP

```
1 REM *************************
2 REM *      ROBOFLIP         *
3 REM *   BY FRED B.SCERBO    *
4 REM *     60 HARDING AVE.   *
5 REM * NORTH ADAMS,MA 01247 *
6 REM *  COPYRIGHT (C) 1986   *
7 REM *************************
10 CLS0:FORI=1TO32:PRINTCHR$(252
);:NEXT
15 FORY=128TO192STEP32:RESTORE:F
ORI=1TO128:READA:PRINTCHR$(A+Y);
:NEXTI,Y:FORI=1TO32:PRINTCHR$(25
2);:NEXT
20 DATA28,30,28,29,,30,28,29,28,
29,28,28,30,28,30,28,29,16,44,46
,44,44,42,45,40,,36,46,36,46,44,
45
25 DATA,27,19,23,16,26,,21,,21,1
9,19,26,,26,,21,,,43,39,32,40,37
,,,,42,,43,35,39
30 DATA,26,,26,16,26,,21,,21,,,2
6,,26,,21,,,42,36,,,37,,37,32,42
,,42,,
35 DATA28,24,,28,28,28,28,28,,28
,28,28,24,,28,28,28,,44,44,,,,44
,44,44,36,44,36,44,,
40 PRINT@454,"  BY FRED B.SCERBO
 ";
45 PRINT@486," COPYRIGHT (C) 198
6 ";
50 IFINKEY$<>CHR$(13)THEN50
55 CLS0
60 R$=CHR$(128)
65 FORI=3TO7:SET(I,5,2):SET(I+53
,5,2):NEXT
70 FORI=2TO8:SET(I,6,6):SET(I+53
,6,4):NEXT
75 FORI=1TO9:FORY=7TO10:SET(I,Y,
6):SET(I+53,Y,4):NEXTY,I
80 FORI=2TO8:SET(I,11,6):SET(I+5
3,11,4):NEXT
85 FORI=0TO10:FORY=12TO18:SET(I,
Y,8):SET(I+53,Y,3):NEXTY,I
90 FORI=2TO7:FORY=20TO24STEP2:SE
T(I,Y,3):SET(I+53,Y,6):NEXTY,I
95 FORI=1TO8:SET(I,26,7):SET(I+5
3,26,2):NEXT
100 PRINT@227,CHR$(236)CHR$(235)
CHR$(227)CHR$(227)CHR$(232);
```

```
105 PRINT@248,CHR$(196)CHR$(195)
CHR$(195)CHR$(199)CHR$(204);
110 PRINT@131,CHR$(206);:PRINT@1
33,CHR$(194);
115 PRINT@154,CHR$(193);:PRINT@1
56,CHR$(205);
120 GOTO135
125 FORI=175TO399STEP32:PRINT@I,
CHR$(153);:SOUND2,1:PRINT@I,CHR$
(128);:PRINT@I+32,CHR$(150);:SOU
ND2,1:PRINT@I+32,CHR$(128);:NEXT
130 RETURN
135 REM START GAME
140 PRINT@449,"you";:PRINT@472,"
computer";
145 PP=RND(10):IFPP=>6THENCC=1:G
OTO155
150 CC=0
155 YU=10:CP=10:TT=RND(2)
160 GOSUB165:FORI=1TO1000:NEXT:G
OTO170
165 PRINT@34,"";:PRINTUSING"##";
YU;:PRINT@60,"";:PRINTUSING"##";
CP;:RETURN
170 IF TT=1THENGOSUB240:GOSUB280
:TT=2:GOTO180
175 IF TT=2THENGOSUB280:GOSUB240
:TT=1:GOTO180
180 BP=BP+2:IF KK=LL THEN200
185 PRINT@5,R$R$R$"neither"R$"on
e"R$"wins"R$R$R$;
190 PRINT@110,BP;
195 GOTO210
200 IFKK=223THENPRINT@5,R$R$"you
"R$"win"R$"this"R$"time"R$R$R$;:
PRINT@110,R$R$R$R$;:YU=YU+BP:BP=
0:GOTO210
205 IFKK=191THENPRINT@5,R$R$"the
"R$"computer"R$"wins"R$R$R$;:PRI
NT@110,R$R$R$R$;:CP=CP+BP:BP=0
210 IF YU=0THEN320
215 IF CP=0THEN320
220 GOSUB165
225 FORI=1TO1500:NEXT:PRINT@461,
R$R$R$R$R$;
230 GOTO170
235 GOTO235
240 PRINT@5,"press"R$"spacebar"R
$"to"R$"flip";
245 X$=INKEY$:FORI=1TO30:NEXT:PR
INT@231,CHR$(191);:AK=RND(-TIMER
):FORI=1TO30:NEXT:PRINT@231,CHR$
(223);:IFX$<>CHR$(32)THEN245
250 PRINT@200,R$;:YU=YU-1:GOSUB1
65
255 ZZ=12:FORI=14TO9STEP-1:ZZ=ZZ
+3:SET(ZZ,I,5):FORKY=1TO30:NEXTK
Y:RESET(ZZ,I):NEXTI:GOSUB125
260 KK=RND(50):IFKK=>26THENKK=22
3
265 IFKK<=25THENKK=191
270 PRINT@461,CHR$(KK);
275 RETURN
280 PRINT@5,"the"R$"computer"R$"
flips"R$"now";
285 CP=CP-1:GOSUB165
290 FORI=1TO10:A=RND(-TIMER):PRI
NT@248,CHR$(191);:FORII=1TO30:NE
XTII:PRINT@248,CHR$(223);:FORII=
1TO30:NEXTII:NEXTI
295 ZZ=51:FORI=14TO9STEP-1:ZZ=ZZ
-3:SET(ZZ,I,5):FORKY=1TO30:NEXTK
Y:RESET(ZZ,I):NEXTI:GOSUB125
300 LL=RND(50):IFLL=>26THENLL=19
1
305 IFLL<=25THENLL=223
310 PRINT@465,CHR$(LL);
315 RETURN
320 IF KK<>LL THEN BP=BP/2:YU=YU
+BP:CP=CP+BP:BP=0:FORI=1TO1000:N
EXTI:PRINT@5,R$"you"R$"both"R$"s
plit"R$"them"R$R$;
325 IF KK<>LL THENPRINT@110,R$R$
R$R$;:PRINT@461,R$R$R$R$R$;:FORI
=1TO1000:NEXT:GOTO220
330 IF YU=0 THEN PRINT@5,"you"R$
"have"R$"lost"R$"the"R$"game";:G
OSUB165
335 IF CP=0 THEN PRINT@5,R$"the"
R$"computer"R$"has"R$"lost"R$;:G
OSUB165
340 X$=INKEY$:IFX$<>CHR$(13)THEN
340
345 PRINT@110,R$R$R$R$;
350 PRINT@461,R$R$R$R$R$;
355 GOTO135
```

Hint . . .

Sound Advice

When I hooked my Color Computer up to a monitor, I knew something was missing. I had built my own video driver, but had not made accommodations for the audio. I started looking for an easy way to obtain sound from the Color Computer without having to build a special circuit. It was then that I stumbled across the cassette port. I just used an adapter to change the ⅛-inch phone plug on the cassette cable to an RCA-type phono plug I could plug into my monitor. The adapter is readily available at your local Radio Shack. Although it doesn't work for some programs, it is an effective and very inexpensive way to get sound from the CoCo.

Frank Mattia
Brooklyn, NY

The Budget Master's Companion

By David V. Haas

This is a monthly budget for use on a tape-based system. It will store up to nine fixed monthly expenses, plus nine other bills. You may enter as many as five paychecks.

Budget will keep a current balance of all checks minus any bills. When a bill is deducted, it is locked out with a `PAID` flag. These flags are stored with your other data on tape to indicate all previously paid bills.

After reviewing paid bills, reset the flags and you're ready for the current week's deductions. I recommend that you save your data after each session and, at the end of each month, save the past month's data so it may be referred to if necessary.

Included is a print function that prints the beginning balance and the balance after each deduction. This is handy for checking off each payment as you mail it.

The paycheck entry section holds a maximum of five entries and each one is added to the current balance as it is entered. Paychecks load in sequence automatically. The date of the entry is also displayed.

When loading miscellaneous bills, you are prompted to clear all bills, keep previous entries, or return to the main menu. The number of currently loaded bills is displayed below the menu as a reminder. When loading miscellaneous bills, no entry names longer than eight characters are allowed.

Load fixed expenses by editing Line 130 to contain up to nine expenses. Then edit Line 110 to load the dollar amounts for the entries made in Line 130. All loaded bills are displayed when deducting fixed or miscellaneous expenses. The current balance (total of all checks minus deducted expenses) is also displayed. You are prompted for Deduct Bill or Main Menu. After deducting a bill, it is locked out with a `PAID` flag. Any time you select a bill higher than those displayed, or one that is locked out, an error tone sounds.

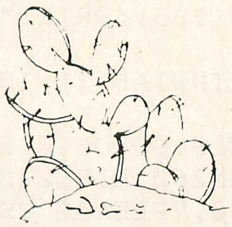
Use the Skipf/Set Gap Option to skipf your user copy of *Budget* and to set a blank gap after it before you save new data to tape.

The printer output is formatted for the CGP-220. The finished printout is color-coded orange for deduction, and green for balances after expenses are subtracted. The control codes are easily changed for other printers. When choosing this option, you are prompted for the amount of pay for the week you are in and the current day of the month. Then you are given the option of printing each expense. Each is printed and subtracted from the paycheck listed. Then the balance is printed and the next expense is listed.

Use the last option, Quit/Reset Flags, to reset all lockout flags after reviewing paid bills. When you are finished, simply choose Quit, and you are through for the day.

(You may contact the author at 126 A Oak Drive, Eglin AFB, FL 32542, 904-651-2913. Please enclose an SASE for a reply when writing.) ☐

Dave Haas is a staff sergeant in the U.S. Air Force stationed at Eglin Air Force Base in Florida, and is a maintenance technician for fire control avionics on F-16 aircraft. He is married, has three children, and enjoys Color Computer programming in his spare time.



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If you have been waiting for a game for your color computer that has everything, your wait is over. **WARP FACTOR X** is here. This all graphics simulation game requires strategy, fast thinking, an eye for detail, and above all experience in knowing the capabilities of your starship and its computer. (See review in Feb. 85 issue of Rainbow.) It requires 32K one disk drive and comes packaged in a vinyl library case. **$34.95**

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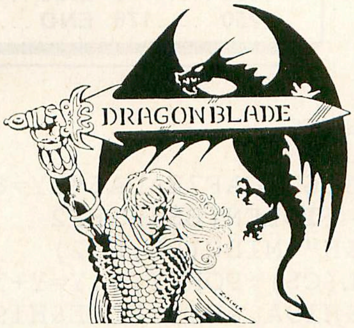

DRAGON BLADE (Rainbow Review 11/86)

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DOLLAR WISE

In todays world of high finance, variable interest rates, balloon payments, and lease options there is a program that can help you sort out the details and make sense of the small print. DOLLAR WISE is an extremely flexible program that will allow you to find the best loan by substituting values for all the different variables that make up the loan. Find the future value and interest paid for either single or multiple deposit savings accounts. Determine mortgage interest paid during a tax year—very good for estimating tax savings on credit purchases also. Should you rent or buy. DOLLAR WISE gives you all the options. It will even provide a loan amortization table print out with Tax Year summaries either by month or year. Requires 32K Tape **-$24.95** Disk - **$27.95**

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750	136	2270	86
880	151	2430	122
1000	101	2600	215
1130	170	2720	66
1250	176	END	141

The listing: BUDGET

```
10 B$="32621CAF7EADA5":Y=&HF8
20 FORR=1TOLEN(B$)STEP2
30 C$="&H"+MID$(B$,R,2)
40 V=VAL(C$):POKEY,V:Y=Y+1:NEXTR
50 POKE&H19A,&H39:POKE&H19B,0:PO
KE&H19C,&HF8:POKE&H19A,&H7E
60 CLS3
70 FORT=1TO500:NEXT
80 CLEAR5000
90 DIMFD(9),PA(5),PD(5),FD$(9),M
D$(9),MD(9),NA$(23),PF(9),PM(9)
100 Q=100:FORX=1TO9:READFD(X):NE
XT
110 DATA111.11,222.22,333.33,444
.44,555.55,666.66,777.77,888.88,
999.99
120 FORX=1TO9:READFD$(X):NEXTX
130 DATALOAN#1,LOAN#2,LOAN#3,LOA
N#4,LOAN#5,LOAN#6,LOAN#7,LOAN#8,
LOAN#9
140 FORDA=1TO23:READNA$(DA):NEXT
DA
150 DATA W,R,I,T,T,E,N, ,B,Y, ,D
,A,V,I,D, ,V., ,H,A,A,S
160 CLS3:FORT=1024TO1055:POKET,3
6:EXEC43359:NEXTT:FORT=1504TO153
5:POKET,36:EXEC43359:NEXTT
170 FORDA=1TO23:PRINT@Q+1,NA$(DA
);:EXEC43359:IFDA=8 THENGOSUB210
:Q=Q+1:NEXTDA:POKE65494,0 ELSEQ=
Q+1:NEXTDA
180 CT=1:PRINT@226,"    1- START
 NEW MONTH      ";
190 PRINT@258,"   2- LOAD CURRE
NT DATA   ";
200 GOTO220
210 PRINT@361,"JUNE 15, 1986";:S
OUND250,1:FORT=1TO500:NEXT:RETUR
N
220 W$=INKEY$:IFW$="" THEN220 EL
SEIFW$="1" THEN230 ELSEIFW$="2"
THEN1840 ELSE220
230 CLS
240 S9=1:PRINTTAB(225):PRINT"ENT
ER 1ST 3 LETTERS            OF
CURRENT MONTH":PRINTTAB(2):INPUT
CM$:GOSUB2390
250 IFCM$=""THENCLS:GOTO240 ELSE
IFLEN(CM$)<>3 THEN260 ELSE270
260 CLS3:PRINT@230,"PLEASE USE 3
 LETTERS!!";:FORT=1TO1000:NEXT:C
LS:GOTO240
270 CLS
280 FORX=0TO31:PRINT@X,CHR$(143)
:NEXT
290 A$="$$ FILE'S BUDGET $$ "
300 FORC=32TO63:PRINT@C,CHR$(175
);:NEXTC
310 IFS9=1 THENPRINT"THIS IS A M
ONTHLY BUDGET FOR USEON A TAPE B
ASED SYSTEM. IT WILL STORE UP TO
 NINE FIXED MONTHLY   BILLS AND A
LSO UP TO NINE OTHER BILLS. YOU
CAN ENTER UP TO FIVE PAYCHECKS
320 IFS9=1 THENPRINT@234,"AND IT
 KEEPS A CURRENTBALANCE OF  ALL
PAYCHECKS MINUS ANY BILLS THAT Y
OU'VE DEDUCTED. WHEN A BILL IS D
EDUCTED, IT IS  LOCKED OUT WITH
A <-paid! FLAG.
                       (PRESS A
NY KEY)"
330 IFS9=2 THENPRINT"THESE FLAGS
 WILL BE STORED ALONGWITH ALL OT
HER DATA ON YOUR DATATAPE TO IND
ICATE ALL PREVIOUSLY PAID BILLS
NEXT TIME. AFTER YOU REVIEW PAID
 BILLS, RESET FLAGS  AND YOU ARE
 READY FOR CURRENT  WEEK'S DEDU
CTIONS."
340 IFS9=2 THENPRINT@275,"SAVE N
EW DATATO TAPE EACH TIME IT'S UP
DATED. SAVE ALL DATA TO A SEPARA
TE TAPEAT THE END OF EACH MONTH
SO YOU CAN REFER BACK TO ANY PAS
T MONTHIF NECESSARY.
               (PRESS ANY KEY)"
350 IFS9=3 THENPRINT"THIS PROGRA
M ALSO HAS A PRINT   FUNCTION TH
AT PRINTS OUT THE    AMOUNT OF Y
OUR PAY BEFORE AND   AFTER EACH
BILL IS DEDUCTED FOR THE CURRENT
 WEEK. YOU CAN CHECK OFF EACH BI
LL AS YOU MAIL IT!          (PRE
SS ANY KEY)"
360 FORI=1TO30:SO$=LEFT$(A$,I):P
RINT@31-I,SO$:Z$=INKEY$:IFZ$=""T
HEN370 ELSE390
370 FORT=1TO100:NEXTT:NEXTI:FORI
=20TO0STEP-1:SO$=RIGHT$(SO$,I):P
```

```
RINT@1,SO$:Z$=INKEY$:IFZ$=""THEN
380 ELSE390
380 FORT=1TO100:NEXTT:NEXTI:GOTO
360
390 S9=S9+1:IFS9=4 THENCLS:GOTO4
00 ELSE270
400 PRINT@4,"PRESS NUMBER OF SEL
ECTION"
410 FORX=32TO63:PRINT@X,CHR$(175
):NEXTX
420 PRINT@68,"1. ENTER NEW PAYCH
ECKS"
430 PRINT@100,"2. LOAD MISC EXPE
NSES"
440 PRINT@132,"3. DEDUCT FIXED E
XPENSES"
450 PRINT@164,"4. DEDUCT MISC EX
PENSES"
460 PRINT@196,"5. SAVE DATA TO T
APE"
470 PRINT@228,"6. LOAD DATA FROM
 TAPE"
480 PRINT@260,"7. SKIPF PROGRAM/
SET GAP"
490 PRINT@292,"8. OUTPUT TO PRIN
TER"
500 PRINT@324,"9. QUIT / RESET p
aid FLAGS"
510 FORX=352TO383:PRINT@X,CHR$(1
75):NEXTX
520 PRINT@388,"CURRENT MONTH:
 "CX$"
530 PRINT@450,"PRESENT BALANCE:
":PRINT@468,USING"$ ####.##";CB
540 Z$=INKEY$:IFZ$=""THEN540
550 IFVAL(Z$)<1 THEN540 ELSE IFV
AL(Z$)>9 THEN540
560 ON VAL(Z$) GOTO570,1140,800,
1360,1640,1840,2160,2510,2050
570 CLS
580 PRINT@0,"CHECK #1.. ":PRINT@
11,USING"$ ###.##";PA(1):PRINT@2
4,"-"CM$PD(1)
590 PRINT@32,"CHECK #2.. ":PRINT
@43,USING"$ ###.##";PA(2):PRINT@
56,"-"CM$PD(2)
600 PRINT@64,"CHECK #3.. ":PRINT
@75,USING"$ ###.##";PA(3):PRINT@
88,"-"CM$PD(3)
610 PRINT@96,"CHECK #4.. ":PRINT
@107,USING"$ ###.##";PA(4):PRINT
@120,"-"CM$PD(4)
620 PRINT@128,"CHECK #5.. ":PRIN
T@139,USING"$ ###.##";PA(5):PRIN
T@152,"-"CM$PD(5)
630 PRINT
640 PRINT"<E>NTER PAYCHECK  <M>A
IN MENU"
650 FORX=384TO415:PRINT@X,"*":NE
XTX
660 PRINT@422,"PAYCHECK'S WILL L
OAD           IN SEQUENCE (1 TO
 5)"
670 Z$=INKEY$:IFZ$=""THEN670
680 IF Z$="M" THENCLS:GOTO400
690 IFZ$="E" THEN700 ELSE670
700 PRINT@295,"ARE YOU SURE (Y/N
)"
710 Z$=INKEY$:IFZ$="" THEN710 EL
SEIFZ$="Y" THEN720 ELSE570
720 CLS:PRINT@7,"paycheck entry
mode"
730 FORX=32TO63:PRINT@X,"X":NEXT
X
740 IFPA(1)=0 THENINPUT"ENTER AM
OUNT";PA(1) :INPUT"DAY OF MONTH"
;PD(1):CB=CB+PA(1):GOTO570
750 IFPA(2)=0 THENINPUT"ENTER AM
OUNT";PA(2):INPUT"DAY OF MONTH";
PD(2):CB=CB+PA(2):GOTO570
760 IFPA(3)=0 THENINPUT"ENTER AM
OUNT";PA(3):INPUT"DAY OF MONTH";
```

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Class Monitor Dual monitor driver
The best monitor driver for any Coco. It drives any composite, colour or monochrome monitors. Complete with dual audio outputs for immediate access of either or both monitors. Simple installation instructions. $31.50 ($39.50 CDN.)

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RAINBOW CERTIFICATION SEAL

Machine Genisis assembly tutor...plus
is a clean and simple approach to learning binary programming. The package includes full beginners instruction in plain language, an editor assembler, a debugger, a disassembler and utilities for advanced study and application. Fantastic value at only $34.95 ($49.95 CDN.)

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Keeping Track more than a disk manager.
If you own more than two disks you'll love Keeping Track. A manager menu of nine utilities that do it all! The real highlight is "D", the directory/autostart. It's a continuous access I.D. directory that loads and executes any program with a single keystroke. All programs fully documented. $29.95 ($38.95 CDN.) Reviewed March 87

Map 'n Zap semi automatic disk repair
The layman's step by step kit for directory and grain table repair. Locates errors, maps out disk contents to screen or printer, backs up any flawed disk and prompts built in disk zap for repair. Complete with full tutorial on Coco's disk input / output access operation. $19.95 ($24.95 CDN.) Reviewed January 87

Code Buster machine language disassembler
Three terrific programs to explore machine language. Screen or printer accurate disassembly of binary code. Simple prompted procedure with some instruction to dissect and understand your ROMs. Fully documented for only $19.95 ($24.95 CDN.)

```
PD(3):CB=CB+PA(3):GOTO570
770 IFPA(4)=0 THENINPUT"ENTER AM
OUNT";PA(4):INPUT"DAY OF MONTH";
PD(4):CB=CB+PA(4):GOTO570
780 IFPA(5)=0 THENINPUT"ENTER AM
OUNT";PA(5):INPUT"DAY OF MONTH";
PD(5):CB=CB+PA(5):GOTO570
790 PRINT@134,"all paychecks loa
ded":FORT=1TO2000:NEXTT:GOTO570
800 CLS:POKE65495,0
810 PRINT@6,"$$ FIXED DEDUCTIONS
 $$"
820 DC$="<-paid!"
830 FORX=32TO63:PRINT@X,CHR$(175
):NEXTX
840 PRINT@64,"1. "FD$(1):PRINT@7
8,USING"$ ###.##";FD(1):IFCK(1)=
1 THENPRINT@88,DC$
850 PRINT@96,"2. "FD$(2):PRINT@1
10,USING"$ ###.##";FD(2):IFCK(2)
=1 THENPRINT@120,DC$
860 PRINT@128,"3. "FD$(3):PRINT@
142,USING"$ ###.##";FD(3):IFCK(3
)=1 THENPRINT@152,DC$
870 PRINT@160,"4. "FD$(4):PRINT@
174,USING"$ ###.##";FD(4):IFCK(4
)=1 THENPRINT@184,DC$
880 PRINT@192,"5. "FD$(5):PRINT@
206,USING"$ ###.##";FD(5):IFCK(5
)=1 THENPRINT@216,DC$
890 PRINT@224,"6. "FD$(6):PRINT@
238,USING"$ ###.##";FD(6):IFCK(6
)=1 THENPRINT@248,DC$
900 PRINT@256,"7. "FD$(7):PRINT@
270,USING"$ ###.##";FD(7):IFCK(7
)=1 THENPRINT@280,DC$
910 PRINT@288,"8. "FD$(8):PRINT@
302,USING"$ ###.##";FD(8):IFCK(8
)=1 THENPRINT@312,DC$
920 PRINT@320,"9. "FD$(9):PRINT@
334,USING"$ ###.##";FD(9):IFCK(9
)=1 THENPRINT@344,DC$
930 PRINT@384,"CURRENT CASH BALA
NCE:":PRINT@407,USING"$ ####.##"
;CB
940 PRINT:FORX=1TO9:P=P+CK(X):NE
XTX:IFP=9 THEN970 ELSEP=0
950 PRINT@450," <D>EDUCT BILL  <
M>AIN MENU"
960 GOTO980
970 PRINT"           <M>AIN MENU
":GOTO1000
980 Z$=INKEY$:IFZ$=""THEN980
990 IFZ$="D" THEN1010 ELSEIFZ$="
M" THENPOKE65494,0:CLS:GOTO400 E
LSE980
1000 IF INKEY$="M" THENPOKE65494
,0:CLS:GOTO400 ELSE1000
1010 PRINT"WHICH BILL TO DEDUCT
(1-9)"
1020 Z$=INKEY$:IFZ$=""THEN1020
1030 IF Z$="0" THEN1020
1040 IFZ$="1"THENIFCK(1)=0 THENC
B=CB-FD(1):CK(1)=1:GOTO800ELSE S
OUND1,3:GOTO800
1050 IFZ$="2"THENIFCK(2)=0 THENC
B=CB-FD(2):CK(2)=1:GOTO800 ELSES
OUND1,3:GOTO800
1060 IFZ$="3"THENIFCK(3)=0 THENC
B=CB-FD(3):CK(3)=1:GOTO800 ELSES
OUND1,3:GOTO800
1070 IFZ$="4"THENIFCK(4)=0 THENC
B=CB-FD(4):CK(4)=1:GOTO800 ELSES
OUND1,3:GOTO800
1080 IFZ$="5"THENIFCK(5)=0 THENC
B=CB-FD(5):CK(5)=1:GOTO800 ELSES
OUND1,3:GOTO800
1090 IFZ$="6"THENIFCK(6)=0 THENC
B=CB-FD(6):CK(6)=1:GOTO800 ELSES
OUND1,3:GOTO800
1100 IFZ$="7"THENIFCK(7)=0 THENC
B=CB-FD(7):CK(7)=1:GOTO800 ELSES
OUND1,3:GOTO800
1110 IFZ$="8"THENIFCK(8)=0 THENC
B=CB-FD(8):CK(8)=1:GOTO800 ELSES
OUND1,3:GOTO800
1120 IFZ$="9"THENIFCK(9)=0 THENC
B=CB-FD(9):CK(9)=1:GOTO800 ELSES
OUND1,3:GOTO800
1130 CLS:GOTO400
1140 CLS3:PRINT@66,"1. CLEAR ALL
 MISC BILLS      ";
1150 PRINT@98,"2. KEEP PREVIOUS
MISC BILLS";:PRINT@130,"3. RETUR
N TO MENU      ";
1160 PRINT@194,NB" BILLS CURRENT
LY LOADED ";
1170 IFNB=9 THENPRINT@265,"MISC
IS FULL!";
1180 Z$=INKEY$:IFZ$="1" THEN1190
 ELSEIFZ$="2" THENCT=NB+1:GOTO12
20 ELSEIFZ$="3"THENCLS:GOTO400 E
LSE1180
1190 FORX=1TO9:MD$(X)="":MD(X)=0
:NEXTX:CT=1:NB=0
1200 GOTO1220
1210 CLS3:PRINT@235,"MISC FULL";
:FORT=1TO2000:NEXT:CLS:GOTO400
1220 IFNB=9 THEN1210 ELSE CLS3:P
RINT" HOW MANY NEW BILLS TO ADD?
"
1230 Z$=INKEY$:IFZ$=""THEN1230
```

```
1240 IFZ$="0" THENCLS:GOTO400 EL
SEIFNB+VAL(Z$)>9 THEN1250 ELSENB
=NB+VAL(Z$):GOTO1270
1250 CLS3:PRINT@226,"MISC ONLY H
OLDS 9 ENTRIES!!";:FORT=1TO1500:
NEXT:CLS:GOTO1220
1260 CLS:PRINT@7," $$ MISC LOADI
NG $$":FORX=32TO63:PRINT@X,CHR$(
175):NEXT:GOTO1290
1270 CLS:FORY=1 TO VAL(Z$):PRINT
@7," $$ MISC LOADING $$"
1280 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
1290 PRINTCT". ":INPUT"NAME OF B
ILL";MD$(CT):IFMD$(CT)=""THEN129
0
1300 IFLEN(MD$(CT))>8 THEN1320
1310 IFLEN(MD$(CT))<8 THENMD$(CT
)=MD$(CT)+CHR$(32):GOTO1310 ELSE
1330
1320 CLS3:PRINT@228,"EIGHT (8) L
ETTERS MAX!";:FORT=1TO1500:NEXT:
CLS:GOTO1260
1330 :INPUT"AMOUNT OF BILL";MD(C
T)
1340 CLS:CT=CT+1:NEXTY
1350 CLS:GOTO400
1360 DC$="<-paid!":CLS:POKE65495
,0
1370 PRINT@5," $$ MISC DEDUCTION
S $$     "
1380 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
1390 IFMD$(1)<>"" THENPRINT@64,"
1. "MD$(1):PRINT@78,USING"$ ###.
##";MD(1):IFCL(1)=1 THENPRINT@88
,DC$
1400 IFMD$(2)<>"" THENPRINT@96,"
2. "MD$(2):PRINT@110,USING"$ ###
.##";MD(2):IFCL(2)=1 THENPRINT@1
20,DC$
1410 IFMD$(3)<>"" THENPRINT@128,
"3. "MD$(3):PRINT@142,USING"$ ##
#.##";MD(3):IFCL(3)=1 THENPRINT@
152,DC$
1420 IFMD$(4)<>"" THENPRINT@160,
"4. "MD$(4):PRINT@174,USING"$ ##
#.##";MD(4):IFCL(4)=1 THENPRINT@
184,DC$
1430 IFMD$(5)<>"" THENPRINT@192,
"5. "MD$(5):PRINT@206,USING"$ ##
#.##";MD(5):IFCL(5)=1 THENPRINT@
216,DC$
1440 IFMD$(6)<>"" THENPRINT@224,
"6. "MD$(6):PRINT@238,USING"$ ##
#.##";MD(6):IFCL(6)=1 THENPRINT@
248,DC$
1450 IFMD$(7)<>"" THENPRINT@256,
"7. "MD$(7):PRINT@270,USING"$ ##
#.##";MD(7):IFCL(7)=1 THENPRINT@
280,DC$
1460 IFMD$(8)<>"" THENPRINT@288,
"8. "MD$(8):PRINT@302,USING"$ ##
#.##";MD(8):IFCL(8)=1 THENPRINT@
312,DC$
1470 IFMD$(9)<>"" THENPRINT@320,
"9. "MD$(9):PRINT@334,USING"$ ##
#.##";MD(9):IFCL(9)=1 THENPRINT@
344,DC$
1480 PRINT@384,"CURRENT CASH BAL
ANCE:":PRINT@407,USING"$ ####.##
";CB
1490 PRINT@450," <D>EDUCT BILL
<M>AIN MENU"
1500 Z$=INKEY$:IFZ$=""THEN1500
1510 IFZ$="D" THEN1520 ELSEIFZ$=
"M" THENPOKE65494,0:CLS:GOTO400
ELSE1500
1520 PRINT"WHICH BILL TO DEDUCT
(1-9)"
1530 Z$=INKEY$:IFZ$=""THEN1530
1540 IFZ$="1"THENIFCL(1)=0ANDMD(
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

```
1)>0  THENCB=CB-MD(1):CL(1)=1:GO
TO1360    ELSE SOUND1,3:GOTO1360
1550 IFZ$="2"THENIFCL(2)=0ANDMD(
2)>0 THENCB=CB-MD(2):CL(2)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1560 IFZ$="3"THENIFCL(3)=0ANDMD(
3)>0 THENCB=CB-MD(3):CL(3)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1570 IFZ$="4"THENIFCL(4)=0ANDMD(
4)>0 THENCB=CB-MD(4):CL(4)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1580 IFZ$="5"THENIFCL(5)=0ANDMD(
5)>0 THENCB=CB-MD(5):CL(5)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1590 IFZ$="6"THENIFCL(6)=0ANDMD(
6)>0 THENCB=CB-MD(6):CL(6)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1600 IFZ$="7"THENIFCL(7)=0ANDMD(
7)>0 THENCB=CB-MD(7):CL(7)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1610 IFZ$="8"THENIFCL(8)=0ANDMD(
8)>0 THENCB=CB-MD(8):CL(8)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1620 IFZ$="9"THENIFCL(9)=0ANDMD(
9)>0 THENCB=CB-MD(9):CL(9)=1:GOT
O1360 ELSESOUND1,3:GOTO1360
1630 CLS:GOTO400
1640 CLS:PRINT"PREPARE RECORDER.
.PRESS ANY KEY"
1650 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
1660 Z$=INKEY$:IFZ$=""THEN1660
1670 FORX=0TO31:PRINT@X,CHR$(175
):NEXTX:PRINT@74,"SAVING DATA"
1680 FORX=96TO127:PRINT@X,CHR$(1
75):NEXTX
1690 OPEN "O", #-1,"DATA"
1700 FORQ8=1TO9:PRINT #-1,CK(Q8)
:NEXTQ8
1710 FORQ9=1TO9:PRINT #-1,CL(Q9)
:NEXTQ9
1720 PRINT #-1,CB:PRINT #-1,CM$
1730 PRINT #-1,CX$:PRINT #-1,NB
1740 FORX=1TO5:PRINT #-1,PA(X):N
EXTX
1750 FORX2=1TO5:PRINT #-1,PD(X2)
:NEXTX2
1760 FORX3=1TO9:PRINT #-1,FD$(X3
):NEXTX3
1770 FORX4=1TO9:PRINT #-1,FD(X4)
:NEXTX4
1780 FORX5=1TO9:PRINT #-1,MD$(X5
):NEXTX5
1790 FORX6=1TO9:PRINT #-1,MD(X6)
:NEXTX6
1800 CLOSE #-1
1810 CLS3
1820 PRINT@299,"DATA SAVED";
1830 FORX=1TO2000:NEXT:CLS:GOTO4
00
1840 CLS:PRINT@0,"PREPARE RECORD
ER..PRESS ANY KEY"
1850 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
1860 Z$=INKEY$:IFZ$=""THEN1860
1870 FORX=0TO63:PRINT@X,CHR$(175
):NEXTX
1880 PRINT@74,"LOADING DATA"
1890 FORX=96TO127:PRINT@X,CHR$(1
75):NEXTX
1900 OPEN "I", #-1,"DATA"
1910 FORQ8=1TO9:INPUT #-1,CK(Q8)
:NEXTQ8
1920 FORQ9=1TO9:INPUT #-1,CL(Q9)
:NEXTQ9
1930 INPUT #-1,CB:INPUT #-1,CM$
1940 INPUT #-1,CX$:INPUT #-1,NB
1950 FORX=1TO5:INPUT #-1,PA(X):N
EXTX
1960 FORX2=1TO5:INPUT #-1,PD(X2)
:NEXTX2
1970 FORX3=1TO9:INPUT #-1,FD$(X3
):NEXTX3
1980 FORX4=1TO9:INPUT #-1,FD(X4)
:NEXTX4
1990 FORX5=1TO9:INPUT #-1,MD$(X5
):NEXTX5
2000 FORX6=1TO9:INPUT #-1,MD(X6)
:IF EOF (-1) THEN2010 ELSENEXTX6
NEXTX6
2010 CLOSE #-1
2020 CLS3
2030 PRINT@299,"DATA LOADED";
2040 FORS=1TO2000:NEXT:CLS:W$=""
:GOTO400
2050 CLS3:PRINT@0,"<Q>UIT.......
......<R>ESET FLAGS"
2060 Z$=INKEY$:IFZ$="" THEN2060
2070 IFZ$="Q" THEN2120 ELSEIFZ$=
"R" THEN2080 ELSE2060
2080 CLS3:PRINT@233,"CLEARING FL
AGS";
2090 FORX=1TO9:CK(X)=0:NEXTX
2100 FORY=1TO9:CL(Y)=0:NEXTY
2110 FORT=1TO1000:NEXT:CLS:GOTO4
00
2120 CLS3:PRINT@224,"DID YOU SAV
E UPDATED DATA (Y/N)?";
2130 Z$=INKEY$:IFZ$="" THEN2130
2140 IFZ$="N" THENCLS:GOTO400 EL
SE2150
2150 CLS:POKE359,60:PRINT"THANK
```

Telewriter-64™
the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

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```
YOU FOR USING MY BUDGET!!!":POKE
359,126:END
2160 CLS:PRINT@5,"  <S>KIPF....<
G>AP":FORT=32TO63:PRINT@T,CHR$(1
75):NEXTT
2170 Z$=INKEY$:IFZ$=""THEN2170
2180 IFZ$="S" THEN2190 ELSEIFZ$=
"G" THEN2320 ELSE2170
2190 CLS:PRINT@0,"PREPARE RECORD
ER..PRESS ANY KEY";
2200 FORT=32TO63:PRINT@T,CHR$(17
5):NEXTT
2210 Z$=INKEY$:IFZ$=""THEN2210
2220 CLS:PRINT@8,"SKIPPING PROGR
AM"
2230 FORX=32TO63:PRINT@X,CHR$(17
5):NEXT
2240 SKIPF
2250 CLS:PRINT@8,"PROGRAM SKIPPE
D!"
2260 FORX=32TO63:PRINT@X,CHR$(17
5):NEXT
2270 FORX=1TO1500:NEXT:CLS
2280 PRINT@2,"  <S>ET GAP.....<M
>AIN MENU"
2290 FORX=32TO63:PRINT@X,CHR$(17
5):NEXT
2300 Z$=INKEY$:IFZ$=""THEN2300
2310 IFZ$="M" THENCLS:GOTO400 EL
SEIFZ$="S" THEN2320 ELSE2310
2320 CLS:PRINT@0,"PREPARE RECORD
ER..PRESS ANY KEY"
2330 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
2340 Z$=INKEY$:IFZ$=""THEN2340
2350 MOTORON:CLS:PRINT@0,"MOTOR
IS ON..TAP ANY KEY TO STOP"
2360 FORX=32TO63:PRINT@X,CHR$(17
5):NEXTX
2370 Z$=INKEY$:IFZ$=""THEN2370
2380 MOTOROFF:CLS:GOTO400
2390 IFCM$="JAN" THENCX$="JANUAR
Y":RETURN
2400 IFCM$="FEB" THENCX$="FEBRUA
RY":RETURN
2410 IFCM$="MAR" THENCX$="MARCH"
:RETURN
2420 IFCM$="APR" THENCX$="APRIL"
:RETURN
2430 IFCM$="MAY" THENCX$=CM$:RET
URN
2440 IFCM$="JUN" THENCX$="JUNE":
RETURN
2450 IFCM$="JUL" THENCX$="JULY":
RETURN
2460 IFCM$="AUG" THENCX$="AUGUST
":RETURN
2470 IFCM$="SEP" THENCX$="SEPTEM
BER":RETURN
2480 IFCM$="OCT" THENCX$="OCTOBE
R":RETURN
2490 IFCM$="NOV" THENCX$="NOVEMB
ER":RETURN
2500 IFCM$="DEC" THENCX$="DECEMB
ER":RETURN ELSECM$="":RETURN
2510 CLS3:PRINT@8,"OUTPUT TO PRI
NTER";
2520 PRINT@231,"ARE YOU SURE (Y/
N)";
2530 Z$=INKEY$:IFZ$="" THEN2530
2540 IFZ$="N" THENCLS:GOTO400
2550 IFZ$="Y" THENCLS:GOTO2560 E
LSE2530
2560 CLS3:INPUT"DAY OF MONTH";DM
:INPUT"AMOUNT OF PAY THIS WEEK";
AP:CLS3:PRINT"*VERIFY PRINTER IS
 ON AND READY*";
2570 PRINT@234,"PRESS ANY KEY";
2580 Z$=INKEY$:IFZ$="" THEN2580
2590 CLS3:PRINT@233,"STARTING BU
DGET";
2600 PRINT#-2,CHR$(27);CHR$(14);
CHR$(27);CHR$(84);CHR$(48);TAB(2
3);"=> BUDGET <=";CHR$(10);CHR$(
```

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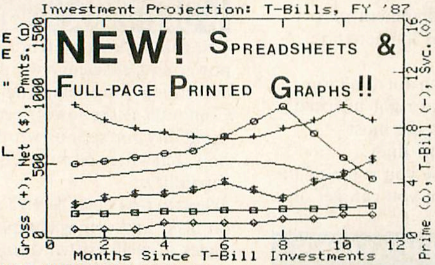

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```
13)
2610 PRINT#-2,TAB(17);CX$;DM", 1
986";TAB(128);CHR$(27);CHR$(84);
CHR$(49);"(CHECK)"
2620 PRINT#-2,CHR$(27);CHR$(84);
CHR$(54);CHR$(28);CHR$(45) "*";C
HR$(10);CHR$(13)
2630 PRINT#-2,CHR$(27);CHR$(84);
CHR$(50)
2640 PRINT#-2,TAB(15);"PAYCHECK
$ ";AP
2650 PRINT#-2,CHR$(27);CHR$(84);
CHR$(48)
2660 FORX=1TO9:CLS3:PRINT@40,"FI
XED DEDUCTIONS";
2670 PRINT@233,FD$(X)"  "FD(X);
2680 PRINT@294,"PRINT THIS BILL
(Y/N)";
2690 Z$=INKEY$:IFZ$="" THEN2690
2700 IFZ$="N" THENNEXTX ELSEIFZ$
="Y" THEN2720 ELSE2690
2710 GOTO2730
2720 PRINT#-2,TAB(15);CHR$(27);C
HR$(84);CHR$(49);"- ";FD(X);" ";
FD$(X);" <F>    ()";CHR$(27);CHR
$(84);CHR$(50);CHR$(10);CHR$(13)
:AP=AP-FD(X):PRINT#-2,TAB(15);"-
---------------":PRINT#-2,TAB(15)
:PRINT#-2,USING"$ ###.##";AP:PRI
NT#-2,"BALANCE":NEXTX
2730 FORX=1TO9:CLS3:PRINT@40,"MI
SC DEDUCTIONS";:IFMD$(X)="" THEN
2790 ELSEPRINT@233,MD$(X)"  "MD(
X);
2740 PRINT@294,"PRINT THIS BILL
(Y/N)";
2750 Z$=INKEY$:IFZ$="" THEN2750
2760 IFZ$="N" THENNEXTX ELSEIFZ$
="Y" THEN2780 ELSE2750
2770 GOTO2790
2780 PRINT#-2,TAB(15);CHR$(27);C
HR$(84);CHR$(49);"- ";MD(X);"  "
;MD$(X);"<M>    ()";CHR$(27);CHR
$(84);CHR$(50);CHR$(10);CHR$(13)
:AP=AP-MD(X):PRINT#-2,TAB(15);"-
---------------":PRINT#-2,TAB(15)
:PRINT#-2,USING"$ ###.##";AP:PRI
NT#-2,"BALANCE":NEXTX
2790 CLS:PRINT#-2,CHR$(27);CHR$(
84);CHR$(54);CHR$(28);CHR$(45)"*
":FORX=1TO3:PRINT#-2,CHR$(10);CH
R$(13):NEXTX:GOTO400
```

Corrections

"GIME That Lowercase" (Hint, January 1987, Page 146): Due to a production error, one of the addresses in the `POKE` statement is incorrect. The address `&HFF33` should be changed to `&HFF22`.

"Fortune Wheel on Tape" (December 1986, Page 50): Line 580 of the tape patch should be as follows:

```
580 FOR RO=1 TO RD
```

The variable name `RO` was listed incorrectly in that issue.

"The Solitary Endeavor" (December 1986, Page 76): Tudor Jones has written to tell of a problem with the shuffle routine in `SOLTAIRE`. Apparently, the cards are not fully shuffled, resulting in the king of spades appearing too often as the top card in Column 7. To fix this, change the value of `51` in the second `FOR-NEXT` loop of Line 230 to `52`.

"Turn Of The Screw: Taking a Look at How Monitors Work" (January 1987, Page 94): The CoCo 3's RGB output uses positive-going sync pulses — not "negative or composite," as stated in this article. The preferred monitors are those that have separate horizontal and vertical sync input lines and accept positive sync. The Sony monitor mentioned by Tony DiStefano (or others in the Profeel, XBR and 11CR series with analog RGB inputs) can be used as well, but a specially made monitor cable is needed.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG prompt and `INFO` at the Topic? prompt.

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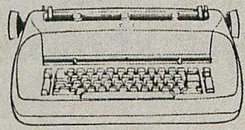

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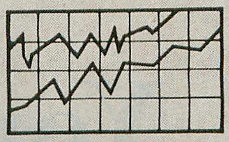

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DOWNLOADS

You Just Have To Stay Cool

By Dan Downard
Rainbow Technical Editor

• *Is there a way to mount a fan inside of a CoCo 2 without another power supply? My computer always overheats and destroys whatever I am doing.*

Chris Inacio
York, PA

Chris, I have seen several versions of fans for the CoCo, from muffin fans, to a little device that I call a "hummingbird." I looked through the ads and couldn't find any for sale. Fans are quite common for serious CoCo users. I would recommend a "hummingbird," my term for a small vibrating, rather than oscillating, fan.

Before you try a fan though, I would suggest a heat sink (to draw off heat and dissipate it) on your PIA chip. Just take a small piece of aluminum (not foil) stock and glue it to your PIA chip using heat conductive cement. Be sure to avoid any contact between the metal and any of the pins on the chip. Good luck,and stay cool!

Level I on CoCo 3

• *I can't get OS-9 Level I to boot on my CoCo 3. Do I have to wait for Level II or do I have a problem with my software or hardware?*

Dennis Alvarez
Euclid, OH

Dennis, you don't need OS-9 Level II to run OS-9 on the CoCo 3. You need Version 02.00.00 of Level I. If you have Version 01.00.00, or 01.01.00, we understand that you can exchange it at your local Radio Shack store for an upgrade. There will be a charge, of course.

While we are on the subject, those of you with CoCo 3s who are interested in 80-by-24 text using OS-9 Level I should check the OS-9 Database on Delphi. There is a program called *CO380* that replaces *CCIO* with either an 80-by-24, or an 80-by-25 full-color driver. The driver uses screen memory outside your Level I workspace, and supports several *O-PAK* and Level II screen commands. You can use most existing Level I software, including most versions of *Dynastar.*

Hopefully, by the time you read this OS-9 Level II should be in the stores. Should you buy Level II? If you are in doubt, try the Level I driver. When you get Level II, the programs will be the same, you'll just have more memory, and a windowing environment.

Auto-Modem Appeal

• *I am in need of a modem with auto-answer/auto-dial capability. I don't have the RS-232 pack. Could you please suggest one? Also, where can I get a copy of super-patched* EDTASM+?

Jason McCampbell
St. Johns, MI

You do not need the RS-232 pack to use a modem, Jason. I use a Hayes Smartmodem connected to the serial I/O port on the rear of my CoCo. You will need an RS-232 pack if you buy a modem that is 1200 baud, or above. Reliable communications through the serial I/O port can only be obtained at 300 baud.

As far as modems are concerned, I would recommend any brand as long as it's Hayes compatible. That means it uses standard Hayes control codes for auto-dial and auto-answer.

As far as obtaining a copy of *Super Patched EDTASM+*, the article originally appeared in the September 1983 issue of the RAINBOW. You must have the original ROM pack to use the patch. Try it, you'll like it!

Delphi Saving

• *I have a 64K CoCo 2 with both disk and cassette. I am currently using a Tandy direct connect modem with a Multi-Pak Interface. I would love to save to disk and am told it can be done, but no one seems to know how. Can you help?*

Vince Falcone
Minden, NY

The problem you are having is typical, Vince. I assume you are using an RS-232 pack. I guess you could be using the Modem pack, but that's a different story. You need to use another terminal package instead of the one in the RS-232 pack. You can disable the ROM in the RS-232 pack by cutting the CE pin. It would probably be better to remove the entire ROM. This prevents a conflict between the disk ROM and the RS-232 pack ROM.

Several programs are available for using the RS-232 pack as a terminal driver. *Autoterm* from PXE Computing, and *Datapack II Plus*, from Cer-Comp both support the RS-232 pack. Two popular public domain programs are *MikeyTerm* and *GETerm*. I'm using *GETerm* on a CoCo 3, and I think it's great.

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago and he has built several 68XX systems.

Assembly Language Answer Corrected

• *In your January 1987 column, Craig Leininger asked you about the up and left arrows in the listing from the assembly language book.*

The up arrow should have been a down arrow which, when shifted on the CoCo, produces the left bracket, and the left arrow should have been listed as the right arrow which, when shifted, produces the right bracket on the CoCo.

Hope this information will help.

Carmen M. Izzi, Jr.
Naugatuck, CT

Thanks for the help, Carmen. I stand corrected. It's clear in the text that these codes stand for the left and right brackets respectively, or indirect addressing in assembly language. I should have known better than to question Radio Shack's proofreaders.

Downloading Doldrums

• *Dan, I'm having no luck at all with the downloads on Delphi. I've downloaded at least six programs and none of them will run. I have no trouble with the downloads on any other BBS, including CompuServe, so I'm wondering if Delphi's downloads work differently from the others. Any advice? Thanks.*

Joseph R. Lavallee
Carrollton, TX

Joe, I haven't noticed a difference between Delphi and any other bulletin boards. I would suggest using the Xmodem protocol for best results. You didn't mention your terminal software, or protocol. As I mentioned in a previous letter, I have used *MikeyTerm* and *GETerm* for downloads with no problems whatsoever. After reading the summary of the program you want to download, just type `XM`, enable your terminal software, and you should be on your way.

CoCo 2 to CoCo 3 Upgrade

• *I have a 64K Color Computer 1. My model number is 26-3002A. Is this an 'F' board? I want to upgrade my CoCo to a Color Computer 3. How can I do this? What VDG chip does the Color Computer 3 have? How can I upgrade my CoCo to red-green-blue analog color (RGB) for use with the CM-8? I understand it is difficult, but I want it done. From what chip does the CoCo 3 get its 640-by-192 graphics? How can I get 128K to 512K? Is its VDG like the CoCo 2? How many BASIC chips are there? In mine I have two BASIC chips (BASIC ROM 1.1 and Extended BASIC 1.0). Would I have to add another "ROM plug" to adapt the CoCo 3's 2.0 BASIC? From what chip does it get the 80-by-24 column display? In CoCo 2 mode are you able to get 80-by-24 display with the CM-8? In what chip does the CoCo 3 hide its 64 colors? How does it switch between ROMs? Where do I get these chips and hardware? This information is very important to me. Thanks a "byte."*

Dan Trusz
Charleston, ME

Dan, you get this year's award for the most questions in the shortest space. You indeed have an 'F', sometimes called a "285" board.

In my opinion, it would be a waste of time to convert your present board to be equivalent, if not impossible. The last time I inquired, the price of 128K CoCo 3s was somewhere around $170. The CoCo 3 already has an RGB output, plus the memory you want.

Now, as Paul Harvey says, you get the rest of the story. The CoCo 3 does not use a VDG, but instead uses a GIME chip both for memory management and graphics, including the 80-column screen. The 64 colors are hidden in memory pointers called palette registers. Physically, the GIME is a very small chip with a multitude of pins, not well suited for breadboarding, to say the least. It would be nearly impossible to duplicate a CoCo 3 without a GIME chip.

One ROM is used that contains both BASIC and Extended BASIC, plus some patches by Microware to add commands to Extended BASIC. The only place to get it is from Radio Shack. The CoCo 2 mode supports only 256-by-192 graphics, the same as you now have. You cannot get good 80-column graphics in the CoCo 2 mode at present, even with an RGB monitor. It's better, but still not good.

I have an excellent idea. Why don't you buy a CoCo 3, take the guts out, put it in your CoCo 1 enclosure, and see what everyone says?

Moving Into High Memory

• *Please tell me how to load the Tandy* Hi-Res Screen Print Utilities *cassette program, Catalog No. 26-3121, into high memory. This program loads: 14848, 16127, 14848 and there are instructions to relocate it at 12288. I have a 32K CoCo and would like to load into higher memory. I've made several attempts without success.*

H.G. Williamson
Myrtle Beach, SC

H.G., all you have to do is add 16383 to each address you mention. It will work fine and allow you to use your extra 16K of memory.

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Your technical questions may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` to arrive at the EXPERTS> prompt, where you can select the "Downloads" online form which has complete instructions.

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BARDEN'S BUFFER

Sailing Off to C

By William Barden, Jr.
Rainbow Contributing Editor

When the C language first became popular on microcomputers, I was given a strong sales pitch by one of my friends, a software developer who had done a lot of work for Radio Shack.

"Oh, we're doing all of our work in C now. It's almost as fast as assembly language!"

"How fast *is* it?" I queried, doing my best Johnny Carson impression, "About a third as fast as assembly language?"

"Oh, no. Much faster than that — maybe only 10 or 15 percent slower than assembly language," he replied. "You can do everything you can do in assembly language, but much easier; all systems programmers are going to use it!"

Is C really that good? Should you use it on the CoCo 1, 2 or 3? We'll help you answer those questions in this column and the next. Among the neater things possible with C on the CoCo is embedded assembly language within the C compiler itself! Our ultimate goal will be to use C with short assembly language code for critical processing that must be as fast as possible.

OS-9 Rears Its Ugly Head

Radio Shack's C Compiler (26-3038, $99.95) runs on the CoCo with no problem, but only under OS-9. This means, of course, that you must plunk down the $69.95 for OS-9 and suffer through learning OS-9 before being able to program in C. You'll also need two disk drives.

Let me say at the outset that learning *any* new system is usually excruciating agony. OS-9 is no exception. I can't tell you with a straight face that I didn't spend hours wondering why I was getting compilation errors when I used uppercase only, hours puzzling over the the fact that `edit` in OS-9 may process less than the total file in its buffer, hours over the OS-9 system generation program. I'll leave that to programmers who smugly say, "Well, of course OS-9 works that way." They aren't telling you about the hours they spent puzzling over some minor problem that was obvious once they had found the answer. In this column I'll try to give you hints and steps to help alleviate that first painful encounter with OS-9 and C.

Steps to Running Your First C Program

The steps in running a C program for the first time are as follows:

1) Prepare a system disk with the C compiler on it in some reasonable, workable configuration.
2) Use the OS-9 `build` command, the OS-9 `edit` utility, or some other editor to produce a C source program in ASCII (text) format.
3) List that program and do a fair amount of desk checking.
4) Compile the program with the C compiler to produce an object program that will run "stand-alone."
5) Run the compiled object program and verify that it runs the way you expected it to.
6) Go back to steps 2 through 6 to correct errors and retry the program until you have a perfect copy.

We'll take these steps one at a time. By the end of this column we will have compiled two small C programs. In the next column we'll work on a larger program and assembly language.

Preparing the System Disk

The C compiler for OS-9 comes on two disks. The first bit of advice I'd give, of course, is to back up those disks and then lock them away. I normally make one backup containing an exact copy of the original disks. This backup is then used to generate working disks.

To back up the two C disks, you'll have to load OS-9, format two disks, and back up the originals. I'll assume that you've never used OS-9 before.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years experience in the industry covers a wide background: programming, systems analyzing and managing projects ranging from mainframes to microcomputers.

Booting Up OS-9

Turn on the system. You'll see the familiar:

```
DISK EXTENDED COLOR BASIC 1.0
COPYRIGHT (c) 1981 BY TANDY
UNDER LICENSE FROM MICROSOFT
OK
```

Put the OS-9 Boot disk into Drive 0, type `RUN "*"` and press ENTER. You'll see this display on the screen:

```
          OS-9 UTILITY DISK VER 01.00.00
-----------------------------------------------------
                  B BOOT OS-9
                T TEST DISK DRIVE
-----------------------------------------------------
              COPYRIGHT 1983 TANDY CORP
                ALL RIGHTS RESERVED
```

Type `B`, but *don't* press ENTER. You'll now see the message:

```
INSERT OS9 DISKETTE
INTO DRIVE 0 AND PRESS A KEY
```

Place the OS-9 System disk into Drive 0 and press a key. If you have Disk BASIC 1.1, just put the OS-9 System Master in Drive 0 and enter DOS. The screen will clear and the message `OS-9 BOOT` appears. After the boot message, OS-9 will be loaded and you'll see:

```
OS-9 LEVEL ONE VR. 02.00.00
COPR. 1980 BY MOTOROLA INC. AND
MICROWARE SYSTEMS CORP.
LICENSED TO TANDY CORP.
ALL RIGHTS RESERVED
   YY/MM/DD HH:MM:SS
TIME?
```

Enter the current date and time and press ENTER. The screen will display `SHELL` and `OS9:`.

You're now ready to format two disks. Insert the first disk to be formatted in Drive 1 (/d1). Type `format /d1`. You'll see:

```
COLOR COMPUTER FORMATTER
FORMATTING DRIVE /D1
Y (YES) OR N (NO)
READY?
```

Press Y. The formatting will begin. After about 10 seconds, the message `DISK NAME:` will appear. Enter any legal OS-9 name.

The formatter will now do a verify pass to check the disk. If all is OK, you'll see:

```
000 001 002 003 004 005 006 007
.
.
020 021 022
NUMBER OF GOOD SECTORS: $000276
OS-9:
```

Repeat the formatting process for as many disks as you'll need, in this case I'd recommend four; two to hold the copies of the original C disks and two working disks.

Backups

Backing up a disk is about as simple. Put a formatted disk in Drive 1. After the OS-9: prompt, type `backup`. The `backup` command assumes a two-drive copy from Drive 0 to Drive 1 if the command is entered this way. You'll now see:

```
READY TO BACKUP FROM /D0 TO /D1
```

At this point remove the system disk from Drive 0 and put in the C disk to be copied. Press Y, and you'll see:

```
A
 IS BEING SCRATCHED
OK ?:
```

Press Y. The backup will now take place. When it's finished, you'll see:

```
SECTORS COPIED: $0276
VERIFY PASS
SECTORS VERIFIED: $0276
OS9:
```

Repeat the process for the second C disk.

C and OS-9 Modules

At this point you're standing around with a silly grin and two copies of the original C disks. The goal now is to merge the data on those C disks into two usable disks that contain an editor, the C compiler and associated modules, and a BASIC subset of the OS-9 system. This is a real problem. With only

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single-sided disk drives, there is no way to have an entire OS-9 system *and* a C compiler on two disks — there simply isn't enough room. Some of the capability of the system will have to be discarded — things like `format` and `backup`, which can be maintained on another disk.

To see what's on the C compiler disk, put the disk into Drive 1 and the OS-9 system disk in Drive 0 and type:

```
chd /d1
dir
```

You'll see:

```
 DIRECTORY OF . 10:36:00
CMDS
```

The `chd` command changes the current data directory to be the main directory on Drive 1. That main directory contained a subdirectory (another directory) called `CMDS`. `CMDS` is the main OS-9 directory that contains the modules necessary to implement OS-9 commands and other commands. OS-9 uses directories in a type of tree structure shown in Figure 1. The `dir` command lists the contents of the current directory.

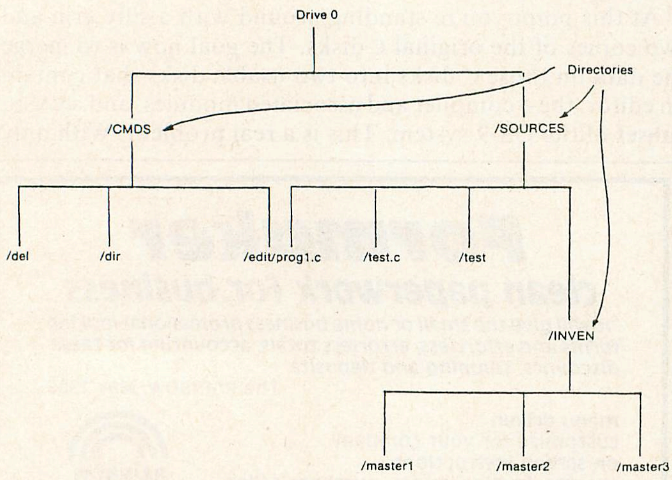

Figure 1: OS-9 Tree Directory Structure

To see the modules in `CMDS`, type:

```
chd /d1/cmds
dir
```

You'll see:

```
 DIRECTORY OF . 10:37:00
cc1       c.prep    c:pass1
c.pass2   c.opt     c.asm
c.link    copy      del
dir       echo      list
```

Many of these program modules are obviously connected with the C compiler; `c.pass1` and `c.pass2` control the two compiler passes, `c.asm` assembles the compiled code and `c.link` links the object modules with library and user modules. Anything with a C prefix is a C-related program module. The `copy`, `del`, `dir`, `echo` and `list` modules, however, are all OS-9 modules that can be found on the master OS-9 disk. They are redundant if an OS-9 disk is available on the system.

If you perform the same process on the C library disk, you'll see three sets of modules — `LIB`, `DEFS` and `SOURCES`. The `LIB` directory contains `clib.r` and `cstart.r`. The file `clib.r` is the main set of library routines for handling day-by-day processing for compiled C programs. Links are made to these routines during the link process. The `DEFS` directory contains other modules necessary for the operation of the C compiler.

The `SOURCES` subdirectory contains source code modules for compilation. You can put your source code modules in this directory or establish your own directory. We'll assume in this article that you'll be putting your source code in this directory.

Getting a Usable C Disk

The best way to get a master C disk is to use the Version 02.00.00 upgrade for OS-9 (26-3030). This upgrade is *not* Level II OS-9. It is an upgrade to Level I OS-9 which is necessary for the CoCo 3. It also supports 80-column screen displays for the CoCo 3 and provides other niceties. Among the benefits is a program called `Config`.

`Config` automatically configures an OS-9 system disk by a question and answer procedure; the result is a tailored disk which is efficient in terms of storage as unnecessary modules are not included. `Config` comes on the boot disk for Version 02.00.00. To use it, load OS-9, put the Boot disk in Drive 0 and type `chx /d0/cmds`.

This changes the execution directory to the `CMDS` directory of the boot disk. The execution directory is used by the system to find programs to be executed. Often the execution directory is set to `D0/CMDS`. Now, execute the `Config` program by typing `Config`. The `Config` program will now load from Drive 0 and display:

```
CONFIG
RS VERSION 01.00.00
.
.
HOW MANY DRIVES DO YOU HAVE:
  1 - ONE DRIVE ONLY
  2 - TWO OR MORE DRIVES
    SELECTION [1,2]
```

Press 2 for two drives. You'll see:

```
BUILDING DESCRIPTOR LIST
    . . . .PLEASE WAIT
```

You'll see a menu of items:

```
->TERM32      X
  TERM80
  D0
  D1
  D2
  D3
  H0 15
  H1 15
  H0 35
  H1 35
```

By using the S and arrow keys, you can put an 'X' opposite the appropriate module you want included in the system.

These modules are "drivers" for the I/O devices — `TERM32` is a 32-character display driver, `TERM80` an 80-character display driver, `D0` through `D4` are disk drives, and `H0` or `H1` are hard disks. Pressing the right arrow displays the second set of devices:

```
T1
T2
T3
M1
M2
NIL
SSC
PIPE
```

`P` is printer, `T` is a terminal port, `M` is a modem and `SSC` is a Speech/Sound cartridge.

In the example here, I selected `TERM32`, `D0`, `D1` and `P`. Pressing D then brings up the query `ARE YOU SURE (Y/N)?:`. Pressing Y brings you into the next part of `Config`, the I/O subroutine select:

```
CO32
CO80
GRFD
```

The selections are for either a 32- or 80-column display, or a graphics module. In the example here I chose `CO32` with the S key and arrow keys and then pressed D for done. After answering another `ARE YOU SURE (Y/N)?`, you'll see:

```
BUILDING BOOT LIST
. . . .PLEASE WAIT
```

You'll see a clock module selection:

```
WHAT CLOCK MODULE IS NEEDED
1 - 60 HZ (AMERICAN POWER)
2 - 50 HZ (EUROPEAN POWER)
SELECTION 1,2
```

Press 1, of course.

You'll now see the message:

```
PLACE A FORMATTED DISK
   IN DRIVE NUMBER 1
HIT ANY KEY TO CONTINUE
```

Put a formatted disk in Drive 1 and press a key. There will be a great deal of disk activity, but you'll finally see:

```
DO YOU WISH TO ADD
[N]O COMMANDS, STOP NOW
[B]ASIC COMMAND SET
[I]NDIVIDUALLY SELECT
[?] RECEIVE HELP
 SELECTION [N,B,F,I,?]
```

We want a minimum disk, therefore press B. The message:

```
PLACE YOUR SYSTEM DISK
IN DRIVE 0
HIT ANY KEY TO CONTINUE
```

appears on the screen.

Put the original OS-9 disk in Drive 0 and press a key. Again, there will be much disk activity — the `Config` program is copying system modules from Drive 0 to Drive 1. The program ends with the OS-9 prompt.

The disk you have generated is bootable from your CoCo 3 or newer versions of the CoCo 2 by entering `dos`. Since a minimum system configuration was requested, it is a "bare-bones" disk, with as few `CMDS` modules as possible. Still, the free command reveals only 423 free sectors out of 630.

The `C` compiler disk uses 521 sectors to store its modules. However, `copy`, `del`, `dir`, `echo` and `list` are found on the compiler disk and are redundant; they take up 14 sectors, so we're left with a space of about 507 sectors that must be found.

Remove the Boot disk and store. Now put the disk you just generated into Drive 0 and the original OS-9 system disk in Drive 1.

At this point, it's merely a question of deleting enough modules on the disk we just configured. Use the `del` command and this sequence to delete from the disk just configured.

```
CHD /D0/CMDS     (points to CMDS directory)
DEL FORMAT       (delete module)
```

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I used `del` to delete the following modules:

/D0/SYS/ERRMSG	error messages in SYS directory
ATTR	file security
BACKUP	backup for disks
DELDIR	deletes a directory
DISPLAY	sends Hex characters
FORMAT	formats a disk
INIZ	initializes devices
LOAD	loads module into memory
MAKDIR	creates a directory
MDIR	displays current module names
MFREE	displays memory areas used
PRINTERR	prints error messages
PROCS	displays list of processes
UNLINK	deallocates module in memory
XMODE	changes device parameters

Then, type `deldir /d0/sys`. The modules on the compiler disk are now transferred to the minimum system disk by a `copy` command. The data directory is first set to `/d1/CMDS`. The execution directory points to `/d0/CMDS` so that the `copy` will be recognized:

```
CHD /D1/CMDS
COPY CC1 /D0/CMDS/CC1
COPY C.PREP /D0/CMDS/C.PREP
COPY C.PASS1 /D0/CMDS/C.PASS1
COPY C.PASS2 /D0/CMDS/C.PASS2
COPY C.OPT /D0/CMDS/C.OPT
COPY C.ASM /D0/CMDS/C.ASM
COPY C.LINK /D0/CMDS/C.LINK
```

Typing `free /d0` now reveals 12 free sectors on the minimum system disk. This disk will be a read-only disk during C compilations. If the data directory is set to `/d0`, the compiler will attempt to write temporary files and run out of space quickly. The data directory should always be set to the second disk, the library disk, by using `chd /d1/sources`.

You now have a minimum C compiler disk with OS-9. Set the new disk aside temporarily and load the original OS-9 disk into Drive 0.

Now turn to the library disk. This disk had 199 free sectors available. It can be used as is with one minor addition. The `edit` module can be added to the disk so that you'll have the ability to generate source files. To do this, back up the library disk and load the working copy into Drive 1. Now transfer the `edit` module from the original system disk by using `copy /d0/cmds/edit /d1/edit`.

You now have two disks for compiling C programs. The modules on each are shown in Figure 2.

Getting the Source Code

During the following, the minimum C system disk will always be in Drive 0 and the library disk will always be in Drive 1. The data directory will always point to `/d1/SOURCES` by using `chd /d1/SOURCES`, and the execution directory will always point to `/d0/CMDS` by using `chx /d0/CMDS`.

Should you start getting strange errors, reboot and initialize the system with those conditions.

The compiler works from a pure ASCII source file. We'll always store that file in `/d1/SOURCES` as a program name of your choice, but with a C suffix. For example, you might call the program `prog1.c`, `myprog.c`, or `a.c`.

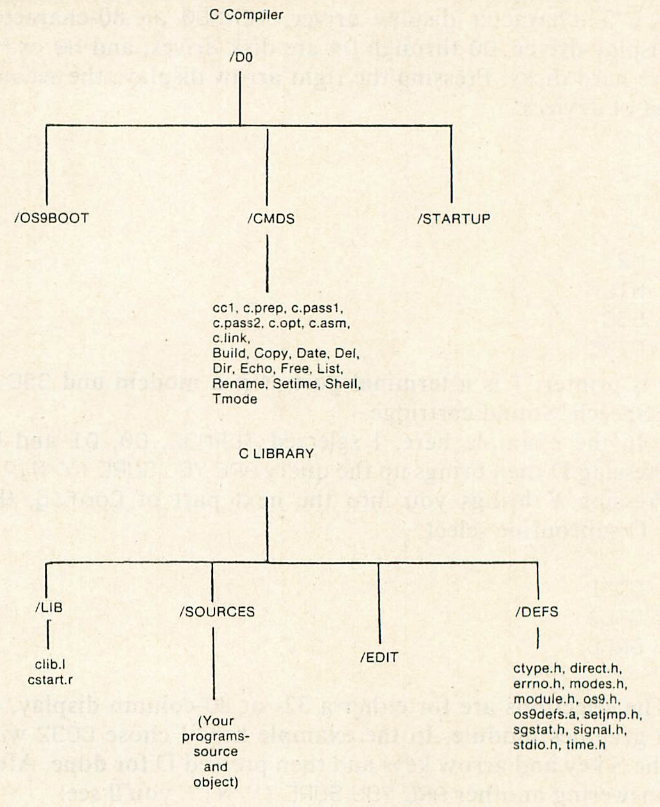
C Compiler
/D0
/OS9BOOT
/CMDS
/STARTUP
cc1, c.prep, c.pass1, c.pass2, c.opt, c.asm, c.link, Build, Copy, Date, Del, Dir, Echo, Free, List, Rename, Setime, Shell, Tmode
C LIBRARY
/LIB
/SOURCES
/EDIT
/DEFS
clib.l
cstart.r
(Your programs- source and object)
ctype.h, direct.h, errno.h, modes.h, module.h, os9.h, os9defs.a, setjmp.h, sgstat.h, signal.h, stdio.h, time.h

Figure 2: C Disk Content

One clue before continuing: the C language is geared to lowercase. Always use lowercase (small letters) for C programs except for necessary text strings. If this is not done, you'll probably get unsatisfied references during the linking process as `link.c` looks for a library routine with an uppercase name (such as `PRINTF`) instead of lowercase (`printf`). To set lowercase, use `tmode -upc`.

Pressing CLEAR followed by 0 will now switch from uppercase to lowercase. Lowercase is denoted on the screen by inverse video. To get back to uppercase once more, repeat CLEAR-0. You can toggle the case at any time.

The simplest way to build a text file is to use `build`. Here's the sequence with a short program:

```
chd /d1/sources
build prog1.c
/* c test program 1 */
main ()
{
printf ("This is rather simple");
}
press ENTER
```

This sequence builds a source program as `/d1/SOURCES/prog1.c`. The right and left brackets are produced by pressing CTRL followed by left or right parentheses.

Compiling the Source

Believe it or not, you're now ready to compile the source. This is the sequence:

```
chd /d1/sources        (this should be unnecessary)
chx /d0/cmds        (this should be unnecessary)
cc1 prog1.c -f=/d1/sources/prog1
```

This sequence tells the compiler to compile source program `prog1.c` in `/d1/SOURCES` and produce an executable object file called `/d1/SOURCES/prog1`.

The compilation is slow — about five minutes. You should see this sequence if everything is going normally:

```
CC1 VERSION RS 01.00.00
COPYRIGHT 1983 MICROWARE
REPRODUCED UNDER LICENSE
TO TANDY
'prog1.c'
c.prep:
c.pass1:
c.pass2:
c.opt:
c.asm:
c.link:
OS9:
```

The last OS-9 prompt indicates that everything went to the end successfully and that `prog1` now resides in `/d1/SOURCES` ready to be executed.

Executing the Compiled Program

To execute `prog1`, enter `/d1/sources/prog1`. This bypasses the execution directory (still at `/d0/CMDS`) and executes the program. The program output here is not too impressive. However, for a first try, this is not bad! (I won't tell you how long it took me to get to this point.)

A Second Program Using Edit

`Build` is fine for editing short programs. However, most programs won't run the first time and must be modified. C is no exception. For this process, an editor that can read in an existing file and easily modify code is required. `Edit` is that type of editor.

We've stored `edit` on the library disk and can execute it without changing the execution directory by using `/d1/edit prog1.c prog2.c`.

In this sequence the program to be edited is `prog1.c` and the edited output program is `prog2.c`. To write a program from scratch, use the form `/d1/edit prog1.c`.

`Edit` will load any old program, or at least a part of the program if the program is large. After `edit` loads, you will see no heading, only the E prompt.

`Edit` operates with many commands. Examples of the most common are:

>*— move to the end of the text in the buffer (not necessarily the entire text)
<*— move to the start of text
-5 — move 5 lines back
+5 — move 5 lines forward
d — delete current line
R*— read in remainder of the text (for larger files)
L*— list all text (press ENTER after each screen)
L — list current line
L5— list next five lines
Q — quit editor, return to OS-9

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To insert lines, type in the line after a blank. The line will be inserted before the current line:

```
E:L
/* this is the current line */
E: temp1 = temp2;
E: -1
temp1 = temp2;
E:12
temp1 = temp2;
/* this is the current line */
E:
```

A second program that adds the numbers from 1 to 100 and prints the result is shown in Listing 1. Try your hand at entering this with `edit`, compiling it, and then executing it.

On to Assembly Language

A final program is shown in Listing 2. It prints the prime numbers from 1 through 90 and uses many of the features of C in doing so. We'll discuss this program, C structures and assembly language interfacing in the next "Barden's Buffer." □

Listing 1: ADDNUM

```
/* c program 2 */
main ()
{
int n, sum;
n = 1;
sum = 0;
while ( n != 101 )
   {
   sum = sum + n;
   n = n + 1;
   }
printf ( "THE SUM=%d      \n", sum );
}
```

Listing 2: PRIMENUM

```
/* PRIME NUMBER GENERATOR PROGRAM */
/* function to initialize array of numbers */
clear_array ( a, size )
int a[ 11 ], size;
{
int i;
for ( i = 0; i <= size - 1; ++i )
  a[ i ] = 2047;
}

/* function to reset bit */
reset_bit ( a, i, j )
int a[ 11 ], i, j;
{
int k, mask, ptwo, temp1, temp2;
mask = 9 - ( ( i * j ) % 10 );
k = mask;
ptwo = 1;
while ( k != 0 )
{
   ptwo = ptwo * 2;
   k = k - 1;
}
mask = ptwo;
temp1 = a[ ( i * j ) / 10 ];
temp2 = temp1 / ( 2 * mask );
a[ ( i * j ) / 10 ] = temp1 - mask;
if ( a[ ( i * j ) / 10 ] / ( 2 * mask ) != temp2 )
   a[ ( i * j ) / 10 ] = temp1;
}

/* function to print results */
print_res ( a, n )
int n, a[ 11 ];
{
int i, j, ptwo, mask, temp1, temp2;
for ( i = 1; i <= n - 1; ++i )
{
   ptwo = 1;
   mask = 9 - ( i % 10 );
   j = mask;
   while ( j != 0 )
   {
      ptwo = ptwo * 2;
      j = j - 1;
   }
   mask = ptwo;
   temp1 = a[ i / 10 ];
   temp2 = temp1 / ( 2 * mask );
   a[ i / 10 ] = temp1 - mask;
   if ( a[ i / 10 ] / ( 2 * mask ) != temp2 )
      a[ i / 10 ] = temp1;
   else
      printf ( "%d      \n", i );
}
}

/* driver */
main ()
{
int numbers[ 11 ], i, j;
printf ( "P R I M E  N U M B E R S\n" );
clear_array ( numbers, 11 );
for ( i = 2; i <= 45; ++i )
{
 for ( j = 2; j <= ( 90 / i ); ++j )
    reset_bit ( numbers, i, j );
}
print_res ( numbers, 90 );
}
```

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OS-9 PROGRAMMING

Finding Your Way With OS-9 Level II

By Peter Dibble

This article is to help you get started with the extended memory available on the CoCo 3 under OS-9 Level II.

On OS-9 Level II systems the 6809 CPU is insulated from memory by a device called a Dynamic Address Translation unit. Each byte in a computer has an address that the processor uses when it wants to read from or write to that memory. A 6809 can generate 64K (that's 65,535) different addresses. This seems to place a limit on the amount of memory a computer built around the 6809 can use. There is no point in having memory your computer can't address, so 6809s have no use for more than 64K of memory. Right?

When the 6809 was designed, 64K was a lot of memory. Even today it sounds like a big number if you think of it byte by byte, but it goes frighteningly fast. The 64K limit is probably the 6809's biggest problem.

The 6809 isn't the only processor with this kind of problem. For a long time mainframe computers were limited to 16 megabytes (that's 16,777,215 bytes) of memory. That limitation turned out to be a terrible problem for them. No joke! The massively popular PC uses an Intel 8088 microprocessor that has its own kind of 64K limitation. It's not easy to use more than 64K on a PC, but it's possible, and now almost everyone does it.

We need to escape from the 64K barrier. Let's look more carefully at the problem. The 6809 can generate 64K different addresses. That means that it can directly address (or, if you like, name) 65,535 bytes of memory. We'll just make the addressing (in a sense) indirect and the barrier will lower.

Everytime the 6809 wants to access memory, we take the address it asks for (which is called a logical address) and feed it to a special device. The special device is called a Dynamic Address Translation unit, or a DAT. On the 6809 side the DAT takes an address range of 64K. On the memory side it generates whatever range it is designed for; in the case of the CoCo, that's 512K.

The addresses coming out of the 6809 are usually called logical addresses and the addresses that go to memory are called physical addresses. The actual memory that the 6809 can address at any moment is called its address space. The trick is to change the 16-bit addresses coming out of the 6809 into the 19-bit addresses required to address the 512K of memory in the machine. In jargon, the DAT maps logical addresses to physical addresses and defines the current address space.

Let's start with a very simple DAT, and do it in decimal instead of binary. An easy way to simplify the DAT is to decrease the amount of input it has. If the address range of some imaginary decimal computer were 0 to 999, we could build a DAT that only translated the digit in the hundreds place. That's a big simplification. Instead of having to know how to translate 1,000 different addresses, the DAT only needs to deal with 10 of them. Let's say that the range of physical addresses is 0 to 4999. The DAT (which is only looking at the hundreds digit), will need to take a number between zero and nine and translate it to a number between zero and 49. The tens and ones digits from the logical address can go directly to memory.

A simple DAT is just a table. For the computer we are working on, it has 10 possible inputs. You make an array with 10 entries and in each position you put the address to which the DAT should translate that input. If the DAT contained 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, it would translate addresses into themselves. The number at Index 0 in the table is 0, Position 1 holds 1, and so forth. If the DAT contained 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, it would translate address to the top 10 blocks of the physical address space — in reverse order.

Let's try it again on the 6809. Addresses on the 6809 are 16-bit binary numbers; that is, the range 0 to 65535 decimal is the same as the range 0 to 1111111111111111 binary.

Say the DAT takes the top bit in a logical address and replaces it with four bits. The 6809 will produce 16-bit logical addresses, and the DAT will

---

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convert them into 19-bit physical addresses. Physical memory will be divided into 16 blocks of 32K each, and a program can pick any two of them for its address space. If each program needs 64K, you can run eight of them. More interesting, if all programs share 32K of common memory and have 32K of their own, you can run 15 of them.

A block is the smallest piece of memory a program can have. Doling out memory in 32K chunks isn't very efficient when many programs use only a few hundred bytes. Most Level II systems use 4K blocks, and sizes as small as 512 bytes have been tried. Tandy chose to use 8K blocks on the CoCo 3.

If you are designing a DAT, you can pick any power of 2 you like as a block size. Large blocks lead to wasted memory, but small blocks have costs too — hardware and software. The simple DAT with 32K blocks only needed to store two four-bit physical block numbers to describe an address space. If it had used 8K blocks (like the Color Computer), it would have had to store eight 6-bit numbers. That's a hardware cost. Whenever you want to change to another address space, you have to change the numbers in the DAT. The more bits in the DAT, the more time it takes to change them. That's a software cost.

The cost of memory to store eight 6-bit numbers sounds too small to consider. It isn't. The memory used to store the DAT registers has to be so fast that the DAT can read a value out of them and put it on the physical address lines with no noticeable delay. Any delay in the DAT has to be made up by using faster memory in the rest of the system, or by slowing down the 6809.

The most frequent change to the DAT registers is made when the system switches between a user address space and the system address space. It happens every time an interrupt happens or a program calls OS-9. This is important enough that the DAT in the Color Computer has a special switch called the task register which accelerates it. The DAT actually stores two sets of translation registers, and the task register switches between them. When a program does an OS-9 call or a piece of hardware causes an interrupt, someone switches the task register and OS-9's address space becomes current.

> ***"Any delay in the DAT has to be made up by using faster memory in the rest of the system, or by slowing down the 6809."***

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KISSable OS-9

Bootstrapping Many Systems

By Dale L. Puckett
Rainbow Contributing Editor

We're going to show you a handy way to build new system disks — especially if you are fortunate enough to be using a hard disk-based system. But first we'll take a look at `config` — an excellent alternative for the beginner that comes with OS-9 Level I, Version 2.00.00.

`Config` gives you a menu and lets you select the device descriptors you want to have available on your new system disk. The program is stored in a directory named `CMDS`. The files that hold the modules containing all the required OS-9 device descriptors, device drivers, file managers, etc., are stored in a directory named `MODULES`.

Start by booting your system using a backup copy of the Tandy OS-9 System Disk. After you see the "OS9:" prompt, you must take out the system disk and insert the disk containing `config`. Type `chx /d0/cmds`, press ENTER and type `chd /d0`.

Now, type `config` and follow the directions on the menu. You move from row to row on the menu using the up and down arrows. Select a device by pressing the S. If you want more information about a device, you can get it by pressing H.

When you have finished selecting device descriptors for all the devices you will be using, `config` creates a new `OS9Boot` file and asks if you would like a disk with no commands, a basic command set, a full command set, or a set of individually selected commands.

After you have spent a few weeks — or is it months — waiting for your computer to copy all of your files onto a new system disk, you will come to the realization that you really don't need to have all your files on each and every system disk you own. It is much easier to boot with one disk which contains only the files you need to start the system, e.g., `setime`.

As soon as the system is running you can remove that disk and insert the disk that contains the files you use all the time. As we have mentioned in earlier editions of this column, you may want to load one disk with the files you need when writing, another with files needed while you are programming with assembly language or C. When you move up to a hard disk, you won't even need to swap disks.

Configure a System Disk Using a Pipe

Once you know your way around OS-9, you'll discover there are a lot of ways to skin a cat. For example, using an unformatted directory list utility like `d` or `ls`, and a pipeline to `OS9Gen`, you can configure new system disks quickly.

First, format a new disk to hold your module library. Then, create a directory with a name that describes the configuration you want on your new system disk. For example, I use directory names like `SDISK80`, `HDONLY80`, `HDONLYRS` and `DISTO80ASD0`. The first directory contains modules to make a system disk that uses Dan Johnson's SDisk drivers and the Disto 80-column card.

The second directory does not contain any floppy disk drivers and uses the Disto 80-column card. The third uses the original Radio Shack screen drivers

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and coauthor, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale works as a U.S. Coast Guard lieutenant and lives on Governors Island in New York Harbor.*

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Listing 1: `binary`

```
/*  --------- OS-9 utility ---------- binary ---------
 *
 *               by Dennis J. Duke
 *                  Bessemer, Al.
 *                  06 November 86
 *
 *       This utility will accept a decimal number as input and print
 *       a binary number.
 *
 */

# include     <stdio.h>

int     n;

main (argc, argv)
int      argc;
char     *argv[];
{
    int      i;

    /* Check to make sure the utility was called properly */
    if (argc != 2) {
        fprintf (stderr, "usage: %s number\n", argv[0]);
        exit(0);
    }

    /* Convert input char to int */
    n = atoi (argv[1]);

    for (i = 15; i >= 0; i--) {
        if ((n & (1 << i)) == 0)
            putchar('0');
        else
            putchar('1');

    /* Add a space after each 4 digits */
    if (i % 4 == 0)
        putchar(' ');
    }
    putchar('\n');
}
```

Listing 2: `split`

```
/*  --------- OS-9 utility --------- split ---------
 *            by Dennis J. Duke
 *               Bessemer, Al.
 *               23 November 86
 *
 *      This utility will split a file into smaller files.  This is especially
 *      useful when you wish to use an editor such as 'TS/EDIT' on a file too
 *      large for it's buffer. The syntax is "split [ -n ] infile [ outfile ]",
 *      where 'n' is the number of lines wanted in the new files (default 50).
 *      If 'outfile' is specified, the output files will be given that name
 *      with a-z appended to the name.  If 'outfile' is not specified, the
 *      output files will be named xa-xz.
 */

# include     <stdio.h>

FILE     *fopen(), *fpin, *fpout;

char     suffix[2];
char     outfile[29];
int      scnt = 97; /* Initialize at decimal value of 'a' */

main (argc, argv)
int     argc;
char    *argv[];
{
    int      c;
    char     infile[30];
    int      nolines = 50;   /* Set default to 50 */
    int      linecnt = 0;

    /* Check to make sure the utility was called properly */
```

and runs on a hard disk drive without any floppy drivers. And the final example directory contains modules that let me use the Disto 80-column card on a system with a hard disk drive named d0. The floppy disk drives on that system are named d1 and d2.

"There are many ways to get the right modules in your directories."

You can use the `makdir` utility command to make your new directories. But, how do you get the modules into those directories? I started by saving the standard modules I would need in each and every boot file, regardless of the hardware configuration in a file called `StdBoot`. I used a command line like this:

```
save StdBoot IOMan RBF SCF
Pipeman Piper Pipe Sysgo
```

I used a similar command line to save the modules used by the standard Tandy 32-column screens in a file called `TandyScreen`.

If you forget which modules are in a file a few months after you have created your directory, you can always use the OS-9 `ident` command to find out what you did (`ident -s StdBoot`).

```
11 $C1 $5E46DE . IOMan
24 $D1 $157744 . RBF
10 $D1 $815287 . SCF
 4 $D1 $1A9CC4 . PipeMan
 2 $E1 $5B2B56 . Piper
80 $F1 $CC06AF . Pipe
12 $C1 $DE6D76 . SysGo
```

Let's look at the rest of the modules in my customized directory (`dir tandy`).

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```
 Directory of tandy   00:35:13
StdBoot            parallel
cwccdisk.dr        cwd0.dd
cwd1.dd            KShell
HDBoot             TandyScreen
RSClock            Nil
NilDrv             P
R0                 RamPak
```

`Parallel` contains the device driver that runs the Centronics parallel port on my Disto 80-column card. It is used by the device descriptor `P`. `R0` is the device descriptor for my 512K Disto RAM Disk. It uses the device driver named `RamPak`. `Nil` is a device descriptor that gives you a way to throw the output from a program into that bit bucket in the sky. It uses the driver, `NilDrv`.

`HDBoot` is a file that contains both the device descriptor and device driver for my Disto hard disk interface. `KShell`, is Brian Lantz's `KShell` that comes with Computerware's Advanced Utilities package. And finally, `cwccdisk.dr` is the CCDisk replacement driver sold by Computerware. Notice that I named the file `cwccdisk.dr` instead of `ccdisk.dr` so I could tell the difference between it and the standard Tandy driver by glancing at the filename. The same holds true for the device descriptor, `wd0.dd`.

There are many ways to get the right modules in your directories. For example, if you own the `modbuster` utility from Dan Johnson or have access to the public domain `SplitMod` utility in disk zero of the OS-9 Users Group library you can follow these steps.

Create an empty directory to hold your new modules. Type `makdir configitmyway` and press ENTER. Then, make the new directory your working data directory. Type `chd configitmyway` and press ENTER. Now, use `modbuster` like this: `modbuster /d1/OS9Boot`.

When the command finishes, you'll wind up with a directory containing a file for each module in the `OS9Boot` file on the disk you had mounted in Drive 1. You can now use the OS-9 `del` utility command to delete all of the files that you do not want in your new system disk. After you have finished deleting the unwanted files, use the OS-9 `copy` command to copy any additional module files you may need in the `OS9Boot` file into this directory.

You are now ready to perform pipeline magic with OS-9. Insert a freshly formatted disk in Drive 1 and type `chd configitmyway` and press ENTER. Then type `ls ! os9gen /d1`.

If you don't believe in magic and want to confirm that the proper modules are in your `OS9Boot` file, type `ident -s /d1/os9Boot`.

```
if (argc < 2)
    usage (argv[0]);

/* Check for syntax and '-n' option and set up file names */
if (argv[1][0] == '-') {
    if (argc < 3)
        usage (argv[0]);

    /* Extract the number of lines from argv[1] */
    nolines = atoi (argv[1] + 1);

    /* Get the input file name */
    strcpy (infile, argv[2]);
    /* Get the output file name */
    if (argc >3)
        strcpy (outfile, argv[3]);
    else
        strcpy (outfile, "x");
}
else {
    /* Get the input file name */
    strcpy (infile, argv[1]);
    /* Get the output file name */
    if (argc >2)
        strcpy (outfile, argv[2]);
    else     strcpy (outfile, "x");
    }

    /* Make sure the input file exists */
    if ((fpin = fopen (infile, "r")) == NULL) {
        fprintf (stderr, "%s: can't open %s\n", argv[0], infile);
        exit(0);
    }

    /* Set up output file */
    output (argv[0]);

    /* Main loop to do splitting */
    while ((c = getc (fpin)) != EOF) {
        if (c == '\n') {
            putc (c, fpout);
            linecnt++;
            if (linecnt == nolines) {
                linecnt = 0;
                fclose (fpout);

                /* get next output file */
                output (argv[0]);
            }
        }
        else
            /* Write to output file */
            putc (c, fpout);
    }
    cleanup();
}


usage (fileid)
char    *fileid;
{
    fprintf (stderr, "usage: %s [ -n ] infile [ outfile ]\n", fileid);
    exit(0);
}


output (fileid)
char    *fileid[];
{
    char    newfile[30];

    /* Convert 'scnt' int to char string */
    sprintf (suffix, "%c", scnt);

    /* Don't allow a suffix past 'z' */
    if (scnt++ > 122) {    /* 122 is decimal for 'z' */
        fprintf (stderr, "%s: can't create output files beyond ...z\n", fileid);
        cleanup();
    }

    /* Build output file name */
    strcpy (newfile, outfile);
    strcat (newfile, suffix);

    /* Make sure the output file can be created */

    if ((fpout = fopen (newfile, "w")) == NULL) {
        fprintf (stderr, "%s: can't create %s\n", fileid, newfile);
        cleanup();
    }
}


cleanup()
{
    /* Close files and exit */
    fclose (fpin);
    fclose (fpout);
    exit(0);
}
```

Listing 3: `col`

```
**************************************************
*
* COL  -  (c) 1986 STEPHEN B. GOLDBERG
*
* Displays files, sorted lists etc. in 2 to 5 columns
*
* Use: col [-number] [filename] [...]
*      default = 2 columns (no number option)
*      2 to 5 columns (with '-number' option)
*
* Omit filename(s) for standard input path for use
* with input redirection or in a pipeline
*
* Examples:
*          col filename <ENTER>
*          col -3 file1 file2 <ENTER>
*          list file1 file2!sort!col -5 >/p <ENTER>
*
         ifp1
         use    /d0/defs/os9defs
         endc
*
         mod    len,name,prgrm+objct,reent+1,entry,dsiz
*
pointer  rmb    2   parameter pointer
path     rmb    1   input path number
maxcol   rmb    1   number of columns
maxlen   rmb    1   width of column
count    rmb    1   column counter
buffer   rmb    77   input/output buffer
         rmb    200  stack
         rmb    200  parameters
dsiz     equ    .
*
name     fcs    /col/
         fcb    1   edition number
         fcc    /(c)S.B.Goldberg/
*
table    fdb    $0228,$031a,$0414,$0510
*
******************************
*
* INITIALIZE & FIND FILENAME
*
entry    clr    path   standard input path
         stx    pointer   save param. address
         ldd    ,x   get first param.
         cmpa   #'-   minus sign?
         bne    default   no, use default
         subb   #$32   yes, make binary
         bmi    default   not valid, use default
         cmpb   #3   valid count?
         bhi    default   no, use default
         aslb    double
         leay   <table,pcr   table address
         ldd    b,y   get constants
         leax   2,x   skip count param
         bra    set   save constants
default  ldd    #$0228   two columns
set      std    maxcol   save constants
         sta    count   set counter
fileloop lda    ,x+   get next character
         cmpa   #$20   space?
         beq    fileloop   yes, keep looking
         cmpa   #$0d   filename?
         beq    read   no, use standard input
         leax   -1,x   yes, reset pointer
******************************
*
* OPEN FILE FOR LISTING
*
open     lda    #read.   read mode
```

Once you have created a directory containing the modules needed in the `OS9Boot` file on your first customized system disk you are almost home free. From here on out you can create new directories and copy module files back and forth. Each directory will hold the module files you use with a specific type of hardware configuration. When you're done, make sure to save the disk with these directories so you can use it in the future.

The `dircopy` command from the Computerware Disk Fix and utilities package is a handy tool for this kind of work. And speaking of that utility, here's a reminder that may save you some work. A typical `dircopy` command line might look like this:

```
dircopy /d1/mods /h0/bootmods
/hardisk/tandyscreens
```

Who wants to type all that? Try this instead. Make that long pathlist your working data directory. Then, use OS-9's anonymous directories:

```
chd /h0/bootmods/hardisk
/tandyscreens
OS9: dircopy /d1/mods .
```

The period in the second line above means use the current data directory. Anonymous directories become even more useful if you are only copying a select handful of files from a directory buried deep in OS-9's hierarchical file structure. For example, if there were a file named `Co32` in the preceding directory you would only need to type:

```
copy ./Co32 /d1/Screens/Co32
```

/H0 as /D0 ?

If you want to start a debate, suggest something unconventional or different. During the past few years there have been several hard disk drives introduced for OS-9 based computers. Almost all of them have used /h0 as the name for the hard disk.

On the surface this seems very logical. It makes it very easy to tell which device is the hard drive and which device is the floppy drive. But, it creates problems with a number of programs that look for specific files in directories on device /d0. OS-9 68000 solves the problem by creating a default device named /dd and telling all software developers to use that device name as a standard.

> *"They really sail on a hard disk."*

We reported several months ago that Carl Kreider had found the obvious solution several years ago — rename the module containing your hard disk device descriptor. Call it /d0. I wanted to experiment with Kreider's idea and when I received my hard disk I did just that. It's fantastic; *Deskmate* and the many other Tandy programs that are hard coded to look for special files on device /d0 will never notice the difference. They really sail on a hard disk.

To do the conversion, follow these steps. Use the OS-9 `debug` utility to patch your device descriptor `d1` module. Change the '1' to a '2'. Save this new module into a file named `temp`. Then, verify it and update the CRC.

```
save temp D2 ENTER
verify <temp>D1asD2.dd ENTER
del temp
```

Now, do the same for the module containing the device descriptor for /d0. Call it `d1` and save it in a verified file with updated CRC named `D0asD1.dd`.

Finally, patch the `h0` device descriptor module in the same manner. Change the `h` in `h0` to `d` and save it in a verified file named `H0asD0.dd`. Make sure that you have updated the CRC with the `verify` command's 'u' option.

You can now put the files containing the patched device descriptor modules in a directory with all other modules you need in your new `OS9Boot` file — I used a directory named `Disto80asD0` — and use the procedure above to create a new system disk. After you boot with that system disk, you will be running with a working data directory named /d0 and a working execution directory named /d0/CMDS. This new /d0 will have several megabytes of storage.

```
          os9   i$open   open file
          bcs   out   exit with error
          sta   path   save path number
          stx   pointer   save param. pointer
*******************************
*
* GET ENTRY AND PRINT COLUMN
*
read      leax  buffer,u   buffer address
          lda   path   input path
          ldy   #77   maximum length
          os9   i$readln   get entry
          bcs   error   branch on error
          clrb   clear length counter
loop      lda   ,x+   get character
          cmpa  #$0d   end character?
          beq   setlen   yes, set entry length
          incb  no, count character
          cmpb  #77   maximum length?
          bne   loop   no, count some more
setlen    clra   yes, clear msb of length
newline   tfr   d,y   length to 'Y' register
          leax  buffer,u   buffer address
countit   dec   count   last column?
          beq   endline   yes, print with carriage return
          subb  maxlen   longer than column?
          bpl   countit   yes, take another column
          bsr   print2   no, print entry
          leax  space,pcr   address of fill spaces
          clra   clear msb
          negb   make lsb positive
          tfr   d,y   number of spaces to fill column
          bsr   print2   fill entire column
          bra   read   get next entry
endline   lda   maxcol   new column count
          sta   count   save it
          cmpb  maxlen   longer than column?
          bhs   skip   yes, skip column
          bsr   print1   no, print it
          bra   read   get next entry
skip      pshs  y   save length
          bsr   carrtn   carriage rtn. to next line
          puls  d   retrieve length
          bra   newline   print in first column of next line
*******************************
*
* ERROR CHECK AND EXIT
*
error     cmpb  #e$eof   end of file?
          bne   out   no, quit with error
          lda   path   input path number
          beq   endit   standard input, quit
          os9   i$close   close file
          ldx   pointer   param. pointer
          lda   ,x   get param. char.
          cmpa  #$0d   end of command?
          bne   open   no, get next file
endit     bsr   carrtn   yes, print car. rtn.
          clrb   clear error
out       os9   f$exit   quit
*******************************
*
* PRINT ENTRY SUBROUTINE
*
carrtn    leax  <cr,pcr   car. rtn.
print1    ldy   #77   maximum line length
print2    lda   #1   standard output path
          os9   i$writln   write to screen
          bcs   out   exit with error
          rts   return
*
cr        fcb   $0d
space     fcc   /
          emod
len       equ   *
```

Listing 4: `prompt`

```
***********************************************************
*
* PROMPT  -  COPYRIGHT (c) 1986 S. B. GOLDBERG
*
* Changes shell prompt for Level I CoCo OS-9
* Works with Ver. 1 and Ver. 2 CoCo OS-9
*
* Use: prompt [new_prompt]
*      characters past 4 will be omitted
*
* If new_prompt parameter is not entered on the command line,
* you will be asked for a new prompt.  Type in the prompt and
* press <ENTER>.  You MUST use this mode if you want any shell
* command characters (<>!&#) in the prompt.  If you don't want
* a change, make no entry and press <ENTER> to exit.
*
         ifp1
         use    /d0/defs/os9defs
         endc
*
         mod    len,name,prgrm+objct,reent+1,entry,dsiz
*
newpmpt  rmb    5  prompt buffer
         rmb    200  stack
         rmb    50  parameter
dsiz     equ    .
*
name     fcs    /prompt/
         fcb    1  edition number
         fcc    /(c) 1986 S.B.Goldberg/
ask      fcb    7  bell
         fcc    /New Prompt: /
shell    fcc    /shell /  module name
*******************************
*
* INITIALIZE & GET NEW PROMPT
*
entry    ldd    #0
         std    ,u  clear new
         std    2,u  prompt buffer
         pshs   u  save buffer address
         lda    ,x  parameter character
         cmpa   #$0d  parameter?
         beq    getpmpt  no, ask for prompt
         ldb    #4  character counter
loop     lda    ,x+  get param. char.
         cmpa   #$0d  end?
         beq    find  yes, find shell
         sta    ,u+  no, save it
         decb   done?
         bne    loop  no, get more
         bra    find  yes, find shell
getpmpt  leax   <ask,pcr  new_prompt prompt
         lda    #1  standard output path
         ldy    #13  length of prompt
         os9    i$write  prompt to screen
         bcs    out  exit with error
         deca   standard input path
         ldy    #5  maximum prompt length
         tfr    u,x  buffer address
         os9    i$readln  get new prompt
         bcs    out  exit with error
         cmpy   #1  new prompt?
         beq    noerr  no, quit
         tfr    y,d  yes, length to 'b'
         decb   less carriage return
         clr    b,x  clear carriage return
*******************************
*
* LOCATE SHELL AND PATCH
*
find     leax   <shell,pcr  module name
         clra   any type or language
         os9    f$link  link for address of shell
```

Sometimes you will want to strip your `OS9Boot` file down to the bare minimum so that you will have the maximum amount of memory available for your application program. *Deskmate*, for example, needs more than 150 pages to run.

> ***"The CoCo 3 shell has a new parameter that lets you set up windows easily."***

One way to do this is to remove the floppy disk driver and device descriptors from your system, leaving the driver and device descriptor for the new hard disk named /d0 in place. We tried this with our system and it works quite well. We simply copied the modules from the directory `DISTO80ASD0` into a new directory named `HDONLY80` and deleted the floppy driver and descriptors and several other modules.

Practice with these techniques and before long you'll be able to configure your OS-9 system the way you like it. If you have a number of start-up disks, you can pick the one that matches the job you need to get done.

Exploring the CoCo 3 Shell

The CoCo 3 shell has a new parameter that lets you set up windows easily. For example, to start a shell in device `/w3` — one of seven predefined CoCo 3 windows, you need only type `shell -i=/w3&`.

This command initializes input, output and error path for the shell running in the window named `/w3`. You can kill the `/Term` device by starting a shell on another device without including the concurrent process operator '&'. For example, `shell -i=/t1`.

There is also a shorthand notation. Redirect some data with ">/1" and the output will go to the standard output path. If you use ">>>" you will redirect both the standard output and standard error paths. A "<>>" will redirect the standard input and standard output paths.

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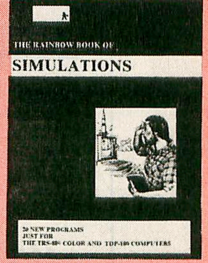

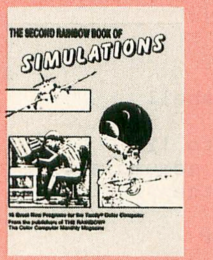

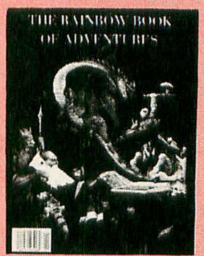

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```
          bcs    out    exit with error
          os9    f$unlink    unlink shell
          bcs    out    exit with error
          puls   x   retrieve buffer address
          ldd    ,x++   first new prompt chars
          std    $36,u    patch shell
          ldd    ,x   last new prompt chars
          std    $38,u    patch shell
******************************
*
* ADJUST CRC FOR NEW PROMPT
*
          tfr    u,x    shell address
          ldd    2,u    get length of shell
          subd   #3   less CRC bytes
          tfr    d,y    update length to 'Y'
          leau   d,x    address of CRC accumulator
          ldd    #$ffff    initialize the
          std    ,u   shell module
          sta    2,u    CRC accumulator
          os9    f$crc    do count
          bcs    out    exit with error
          com    ,u+    complement
          com    ,u+    the CRC
          com    ,u   bytes
noerr     clrb    clear error
out       os9    f$exit    quit
*
          emod
len       equ    *
          end
```

Listing 5: `modcrc`

```
/* copyright (c) 1986 by Gregory A. Law */
/* Used to update the module CRC of a module in memory. No need to save */
/* the module to disk, all work done in memory */
/* use: modcrc module <module> <...> */

main(argc, argv)
int  argc;
char *argv[];
{
     int  i;                   /* temporary counter variable */
     unsigned  Address;        /* module address */
     unsigned  *Length;        /* pointer to module size */
     char      *Module;        /* pointer to the module */
     char      *ModCrc;        /* pointer to the CRC values of the module */

     for (i = 1; i < argc; i++) {          /* do for all modules on command line */
          Module = modlink(argv[i], 0, 0); /* get the module address via Link */
          Address = Module;                /* pass the address from the pointer */
          if (Address == -1)               /* if the module is not found */
               exit(234);                  /* return module not found error */

          Length = Address + 2;                      /* get module size */
          ModCrc = Module + (*Length) - 3;           /* get address of CRC bytes */
          ModCrc[0] = ModCrc[1] = ModCrc[2] = 0xFF; /* initialize all to $FF */
          crc(Module, *Length - 3, ModCrc);
          ModCrc[0] = ~ModCrc[0];          /* complement the CRC */
          ModCrc[1] = ~ModCrc[1];
          ModCrc[2] = ~ModCrc[2];
     }
}
```

Listing 6: `date`

```
/* prints the date, day of week, time, and julian date */
/* copyright (c) 1986 by Gregory A. Law */

#include <stdio.h>
#include <ctype.h>
#include <time.h>
#include <macros.h>

#define MO           0               /* Month flag */
#define DAY          1               /* Day flag */
#define YR           2               /* Year flag */

#define BAD_DIGIT    -1              /* error flags */
#define BAD_MONTH    -1
#define BAD_DAY      -1
#define BAD_YEAR     -1

main()
{
     struct sgtbuf  time;      /* structure for holding the date & time */
     char day[40];             /* array for day name */
     int  julian;              /* variable for julian date */
     char *s;                  /* pointer to char */
```

Third-party developers are in hot pursuit of CoCo 3 tools. For example, Computerware will soon release a CoCo 3 `KShell`. It will support the operators above and up to nine function keys. It will include a data module named `shelldef` that will hold a set of shell parameters that you can grab when you need them.

> ***"Third-party developers are in hot pursuit of CoCo 3 tools."***

March Listings

Our mailbox was full of educational and useful programs for "KISSable OS-9" readers this month. We feature the work of Dennis J. Duke of Bessemer, Alabama; Stephen B. Goldberg of Bethpage, New York and Greg Law of Columbus, Georgia, and Delphi CoCo SIG fame.

Dennis sent us a number of utilities and it was hard to make a choice for the first offering. We decided to list two of his C programs, *Binary* and *Split*. *Binary* gives you a quick way to find the binary value of a number. You type in a decimal number, it prints the equivalent binary number. It will print all numbers between 1 and 65,535.

If you write many long stories with *TSEdit* or the *Deskmate* editor, you will find *Split* a very useful tool. It gives you a way to split a large file into two or more smaller files. You can tell *Split* how many lines you want in each file. If you don't, you get 50 lines each in as many files as it takes to hold your original — up to 26. You can name your output files or let *Split* name them for you. If you opt for the latter, your filenames will read `xa` through `xz`.

Dennis is a staff analyst and lives in a UNIX world at Bell South Services. However, he does no C programming at work. "That's why I welcome the opportunity to play with the CoCo," he said. He asked if there was a relatively simple way to modify Level I OS-9 to give an 80-column display with the new CoCo 3. The answer may be found in a public domain 80-column CoCo 3 device driver on Compuserve's OS-9 SIG as well as Delphi's OS9 Online SIG.

Stephen Goldberg can't seem to stop writing excellent CoCo-based OS-9 programs. "It's always bugged me when I list or sort a file with small entries and the output marches down the left side of the screen displaying only 24 entries at a time — wasting the rest of the screen," he said. "*Col* is my solution.

"To use the program, type `col` followed by a minus sign and the number of columns you want, followed by the file or files you want to list in column form," he said. "You may display your file in two to five columns."

If you do not type a filename, *Col* will take its input from the standard input path. Its output goes to your standard output path. This means that both the input and output to *Col* can be redirected to a file or printer.

Goldberg also sent along a fun utility command that shows you how you can patch your `shell` command file to install a new prompt. We showed you how to do the same thing using `debug` and a shell script some time ago. It's just one more way to prove that there are many ways to solve the same problem when you have a powerful operating system like OS-9 at your fingertips.

How many times have you run through the "debug, save, verify -u, os9gen" procedure — just to patch a module? Greg Law wrote a utility named *ModCRC* to make life simpler. His program updates the module CRC of a module while it is still in memory. Your new sequence becomes "`debug`, `modcrc`, `cobbler`."

If you get tired of having your CoCo give you the military time, rejoice. Law has come to the rescue of those who yearn for a less militant clock. In fact, his *Date* utility also gives you the Julian date — just in case you work in a military procurement center. The output from Law's program look like this:

```
Thursday, November 13, 1986 11:35:45 PM
Julian 86255
```

Enjoy this month's listings. We'll add a few more next month if the April Fool's pranksters don't strike too hard. If you have an OS-9 programming tip or utility you would like to share with "KISSable OS-9" readers, let us hear from you. Keep on hacking! ☐

```
        static char *month[] = {
                "None",
                "January",
                "February",
                "March",
                "April",
                "May",
                "June",
                "July",
                "August",
                "September",
                "October",
                "November",
                "December"
        };

        getime(&time);              /* get the date and process into julian */
        julian = jul(time.t_month & 0xff, time.t_day & 0xff, time.t_year & 0xff);

        /* now process the day of week */
        zeller(time.t_month & 0xff, time.t_day & 0xff, time.t_year & 0xff);

        printf("%s %02d, %04d ", month[time.t_month], time.t_day,
                time.t_year + 1900);

        if (time.t_hour == 0)
                printf("12:%02d:%02d AM", time.t_minute, time.t_second);

        else if (time.t_hour > 0 && time.t_hour < 12)
                printf("%d:%02d:%02d AM", time.t_hour, time.t_minute,
                        time.t_second);

        else if (time.t_hour == 12)
                printf("12:%02d:%02d PM", time.t_minute, time.t_second);

        else if (time.t_hour > 12)

                printf("%d:%02d:%02d PM", time.t_hour - 12, time.t_minute,
                        time.t_second);

        printf("\nJulian %02d%03d\n", time.t_year, julian);

}

jul(month, day, year)
int  month;
int  day;
int  year;
{
        static int days[13] = {0, 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};

        int             n = 0;
        int             mdy[3];
        unsigned int    retjul;

        days[2] = 28;

        mdy[DAY] = mdy[MO] = mdy[YR] = 0;

        mdy[MO] = month;            /* set in the month, day, and year */
        mdy[DAY] = day;
        mdy[YR] = year;

        if(mdy[MO] < 1 || mdy[MO] > 12)     /* invalid month? */
                return(BAD_MONTH);

        if(mdy[YR] < 100) {
                if(mdy[YR] < 80)            /* year < 80 then 21'st century */
                        mdy[YR] += 2000;
                else                        /* else 20'th century */
                        mdy[YR] += 1900;
        }

        /* check to see if it is a leap year */
        if(mdy[YR] % 4 == 0 && mdy[YR] % 100 != 0 || mdy[YR] % 400 == 0)
                days[2] = 29;

        /* check for invalid day of month */
        if(mdy[DAY] < 1 || mdy[DAY] > days[mdy[MO]])
                return(BAD_DAY);

        /* the blunt work routine, add up all days in previous months */
        retjul = mdy[DAY];
        for(n = 1; n < mdy[MO]; n++)
                retjul += days[n];

        return(retjul);
}

/* this routine returns a pointer to a string indicating the day of week */
int zeller(months, days, yer)
int  months;
int  days;
int  yer;
{
        int  n = 0;
        int  month;
```

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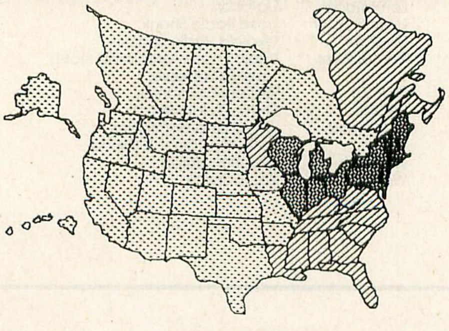

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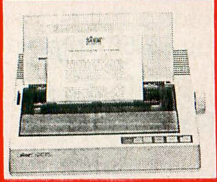

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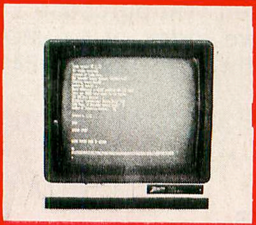

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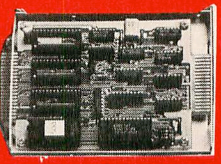

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INSERT, CHANGE or DELETE CHARACTERS anywhere on the screen. Simply move to what you wish to change, change it and continue working!

LOWERCASE COMMANDS are OK! EDITOR 3 lets you type in lowercase any time or all the time. Lowercase command words are automatically translated to uppercase for BASIC. Of course, lowercase text within quotes stays lowercase. This is great when typing wiht the CoCo 3's 40 or 80 column mode with true lowercase!

MERGE LINES within a program with just a few keystrokes!

AUTO KEY REPEAT — Hold down any key and it will repeat.

INVISIBLE — Once EDITOR 3 has been loaded in, it is activated with a single keystroke! It hides itself out of the way of other programs and can be turned off any any time. Pressing RESET will not hurt EDITOR 3!

EASY TO USE — Installation takes seconds! Well-written goof-proof manual included.

COCO 1 & 2 — Yes, even though this program was conceived for the powers of the new CoCo 3, we still support the previous Color Computers. They too, need their BASIC Freedom!

EDITOR 3 — So easy and handy, you'll never want to run your CoCo without it!

Available on DISK only for CoCo 3 @ $29.95 + s/h

CoCo 1/2 version can not support 40 or 80 column screens. CoCo 1/2 version is available on TAPE for $27.95 + s/h or DISK for $29.95 + s/h.

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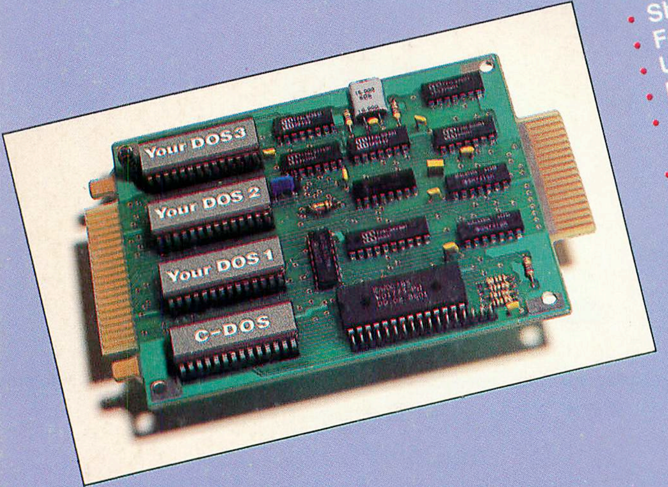

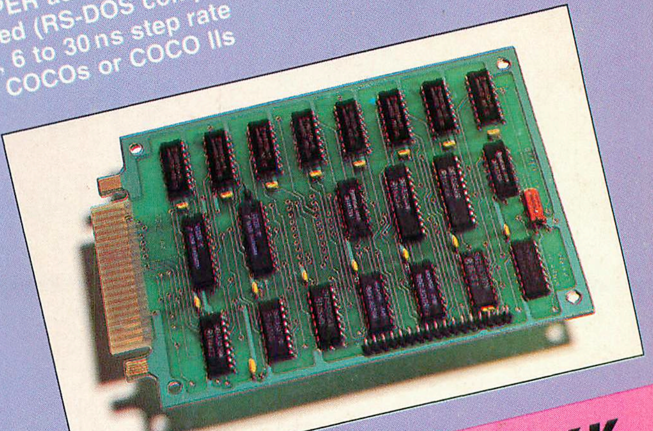

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